55-1520-240-23-5

TM 55-1520-240-23-5

TECHNICAL MANUAL

# AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL

# CH-47D HELICOPTER

This copy is a reprint which includes current pages from Changes 1 through 8

HEADQUARTERS, DEPARTMENT OF THE ARMY

10 MAY 1983

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TM 55-1520-240-23-5
C 8

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WASHINGTON, D.C., 25 July 1988

## Aviation Unit and Aviation Intermediate Maintenance Manual

## CH-47D HELICOPTER

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| 6-30.1/6-30.2 | 6-30.1 and 6-30.2 |
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| 6-487 and 6-488 | 6-487 and 6-488 |
| 6-491 and 6-492 | 6-491 and 6-492 |

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*Chief of Staff*

**Official:**

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## CH-47D HELICOPTER

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## CH-47D Helicopter

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## CH-47D Helicopter

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# WARNING AND FIRST AID DATA.

For artificial respiration and other first aid data, refer to FM 21-11.

Personnel performing instructions involving operations, procedures, and practices which are included or implied in this technical manual shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury, illness, death, or an aborted mission.

**WARNING**

**An operating procedure, practice, etc., which if not correctly followed, could result in personal injury or loss of life.**

**CAUTION**

**An operation procedure, practice, etc., which if not strictly observed, could result in damage to or destruction of equipment.**

**NOTE**

**An operating procedure, condition, etc., which is essential to highlight.**

**WARNING**

### Cleaning Solvents

- **Those areas of skin and clothing that come in contact with cleaning solvents should be thoroughly washed immediately.**
- **Saturated clothing should be removed immediately.**
- **Areas in which cleaning solvents are used should be adequately ventilated to keep vapors to a minimum.**
- **If cleaning solvents contact the eyes, nose, or ears, flush them with generous quantities of water, and then seek medical attention immediately.**

**WARNING**

### Electrical and Electronic Equipment Maintenance

- **Do not wear rings, watches, or metal jewelry when working around electrical equipment. Serious burns can result.**
- **Be careful when working on 150- and 300-volt dc circuits and on ac generator 115- and 200-volt ac outputs. Serious burns can result.**

**WARNING**

### Dangerous Static Charges

Ground the helicopter during parking, fueling, or defueling. Sparks can cause fuel vapor to ignite.

**WARNING**

### Dangerous Voltages at Antenna Terminals

Be careful when working near antenna or antenna terminals. Radio frequency (rf) voltages exist at these points when transmitters are operating. Contact with radiating antennas can cause serious rf burns.

**WARNING**

### Poisonous Carbon Monoxide Fumes

Toxic carbon monoxide fumes may be present inside the helicopter whenever engines or apu are operating with cargo ramp open. Ventilate the cockpit.

**WARNING**

### Corrosive Battery Electrolyte (Potassium Hydroxide)

- The electrolyte used in nickel-cadmium batteries contains potassium hydroxide which is a caustic substance.
- Contact with skin or eyes will cause burns.
- Use rubber gloves, rubber apron, and protective eye covering or face shield when handling battery.
- If personal contact with electrolyte occurs, flush immediately with large amounts of only clean water. Get medical attention immediately.

**WARNING**

### Explosive Battery Hazard

- Before removing or installing battery, make sure battery switch is OFF and battery has cooled down if overheated.
- Connecting or disconnecting battery connector while battery is under load may cause explosion or electrical arcing resulting in injury to personnel.

**WARNING**

### Electrolyte Contamination

- Separate nickel-cadmium batteries and lead-acid type batteries as far as possible from each other.
- Do not let anything associated with a lead-acid battery, including air, come in contact with a nickel-cadmium battery or its electrolyte. Sulfuric acid fumes from a lead-acid battery could result in damage to a nickel-cadmium battery leading to battery failure and a hazard to personnel.
- Do not use same tools or protective clothing for both types of batteries.
- If sulfuric acid has been somehow mixed with electrolyte in the battery. the upper areas of the battery cells will appear green in color indicating battery failure or damage and potential danger to personnel unless replaced.

**WARNING**

### Acids and Alkalines

- Do not add water to acid. A violent action will result. Add acid to water in small quantities.
- Rust stripper is an alkaline solution.
- Avoid skin contact. Wear protective clothing. Wash thoroughly after using.

**WARNING**

### Windshield Rain Repellent

- Do not let windshield rain repellent contact open flame. Deadly hydrogen fluoride gas could be generated.
- Wash hands with soap and water after handling repellent.

**WARNING**

### Antiseize Compounds

- Some antiseize compounds are irritants. Avoid inhaling fumes and contact with skin.
- Wear protective clothing. Wash thoroughly after using.

**WARNING**

### Paints, Varnishes, Dopes, Thinners, and Lubricants

- These materials are generally highly flammable and may be irritants. Work in a well-ventilated area away from open flames.
- Avoid inhaling fumes and prolonged contact with skin. Wash thoroughly after using.

**WARNING**

### Epoxy Resins, Cements, and Adhesives

- These materials may contain toxic or irritating substances. They may also be flammable. Work in a well-ventilated area away from open flames.
- Wear protective clothing. Avoid contact with skin. Wash thoroughly after using.

**WARNING**

### Radiation Hazard

- Some instruments contain radioactive material. Do not try to disassemble these instruments. They present no radiation hazard unless seal is broken.
- If you think seal is broken, do not remove instrument from helicopter before consulting Base Radioactive Protection Officer (AR 40-15).
- Use a beta-gamma radiac meter AN/PDR-27 or equivalent to determine if instrument contains radioactive material (radium).

**WARNING**

### Fire Extinguishing Agents

- Monobromotrifluoromethane ($CF_3Br$) is highly volatile but is not easily detected by smell. It is not toxic, but reduces oxygen available for proper breathing.
- If liquid $CF_3Br$ contacts skin, it can cause frostbite or low temperature burns.
- If agent touches eyes or skin, immediately flush affected area with running water. Get medical attention.

**WARNING**

### Noise

- Sound pressure levels in this helicopter during some operating conditions exceed the Surgeon General's hearing conservation criteria (TB MED251).
- Hearing protection devices, such as aviator helmet or ear plugs, shall be worn by all personnel in and around the helicopter during operation.

**WARNING**

### FOD

- Make sure area is clear of foreign objects before closing access doors, panels, and fairings.
- If area is not clear, damage to components or systems could result in personal injury or death.

**WARNING**

### JP-4/JP-5 Fuel
### MIL-T-5624

- Fuel is flammable. Do not use near welding areas, open flames, or on very hot surfaces.
- Use only with adequate ventilation.
- Avoid prolonged or repeated contact with skin. Prolonged contact may cause drying and irritation of skin.
- Remove saturated clothing immediately.
- Do not smoke when handling fuel.
- Do not take internally.
- Store in approved, metal safety containers.

**WARNING**

### Lubricating Oils
### MIL-L-23699 or MIL-L-7808

- If oil is decomposed by heat, toxic gases are released.
- Prolonged contact with liquid or mist may cause dermatitis and irritation.
- If there is prolonged contact with skin, wash affected area with soap and water. If oil contacts eyes, flush with water immediately. Remove saturated clothing.
- If swallowed, do not try to vomit. Seek immediate medical attention.
- When handling liquid oil, wear rubber gloves. If prolonged contact with mist is likely, wear approved respirator.

**WARNING**

### Lifting Components With Hoist

- Lifting or hoisting of components shall only be done by designated personnel.
- The load capacity rating shall be clearly marked on hoist. Do not exceed load rating.
- Inspection and testing for cracks or defects in hoist system shall be performed on a regular basis.
- Before lifting, alert personnel in immediate areas.
- Before lifting, balance the load.
- Do not stand under load while it is being moved from one area to another on a hoist.
- Do not stand under load to do maintenance work.

**WARNING**

### Hydraulic Pressures

- High pressures used in testing hydraulic components can cause line rupture or component failure.
- Only qualified personnel shall operate, service, and maintain hydraulic test equipment.
- Use heavy plastic shielding at least 1/2-inch thick when applying pressures over 250 psi to prevent injury to personnel.

**WARNING**

### Hydraulic Fluid

- Hydraulic fluid is toxic. It can irritate skin and eyes and cause burns. When fluid is decomposed by heating, it releases toxic gases.
- Avoid inhaling. Use only with adequate ventilation. If prolonged contact with mist is likely, wear an appropriate respirator.
- Avoid contact with skin, eyes, or clothing. Wear rubber gloves if handling liquid.
- In case of contact with skin, immediately wash skin with soap and water. In case of contact with eyes, flush them immediately with clear water and get medical attention.
- If liquid is swallowed, do not induce vomiting; get immediate medical attention.

**WARNING**

### Compressed Air

- Do not use more than 30 psi compressed air for cleaning purposes. Debris propelled under pressure can cause injury to eyes.
- Use eye protection to prevent injury to personnel.

**WARNING**

### Flare Dispenser

- Flares can accidentally fire, sometimes from stray voltage. Injury or death can result.
- Remove all electrical power from helicopter before installing loaded payload module on dispenser assembly.
- Keep hands and face away from end of payload module during installation.

**WARNING**

### Maintenance Platforms/Workstands

- Use only appropriate maintenance platforms/workstands illustrated in TM 55-405-10, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment. Otherwise, personnel injury could result from accidental falls.

**WARNING**

- Do not wear eyeglasses having light sensitive lenses while performing magnetic particle (black light) or fluorescent penetrant inspections.
- Such lenses have a 16 to 45 percent light transmission loss.
- Wearing them can result in failure to detect flaws and cracks under ultraviolet light.

**WARNING**

### Cadmium-Plated Tools

- **Use only chrome-plated or unplated steel tools when working on the helicopter.**
- **Cadmium or zinc-plated tools are not permitted, since these platings are prone to chipping and flaking. The chips and flakes could cause corrosion or fluid contamination.**
- **All tools, regardless of plating type, shall be serviceable and free of chipping.**

TECHNICAL MANUAL

No. 55-1520-240-23

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *10 May 1983*

# Aviation Unit and Aviation Intermediate Maintenance Manual
# CH-47D HELICOPTER

## REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to Commander, U.S. Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MPSD, 4300 Goodfellow Boulevard, St. Louis, Missouri, 63120. A reply will be furnished to you.

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# CHAPTER 6

# DRIVE SYSTEM

## SECTION I

## DRIVE SYSTEM

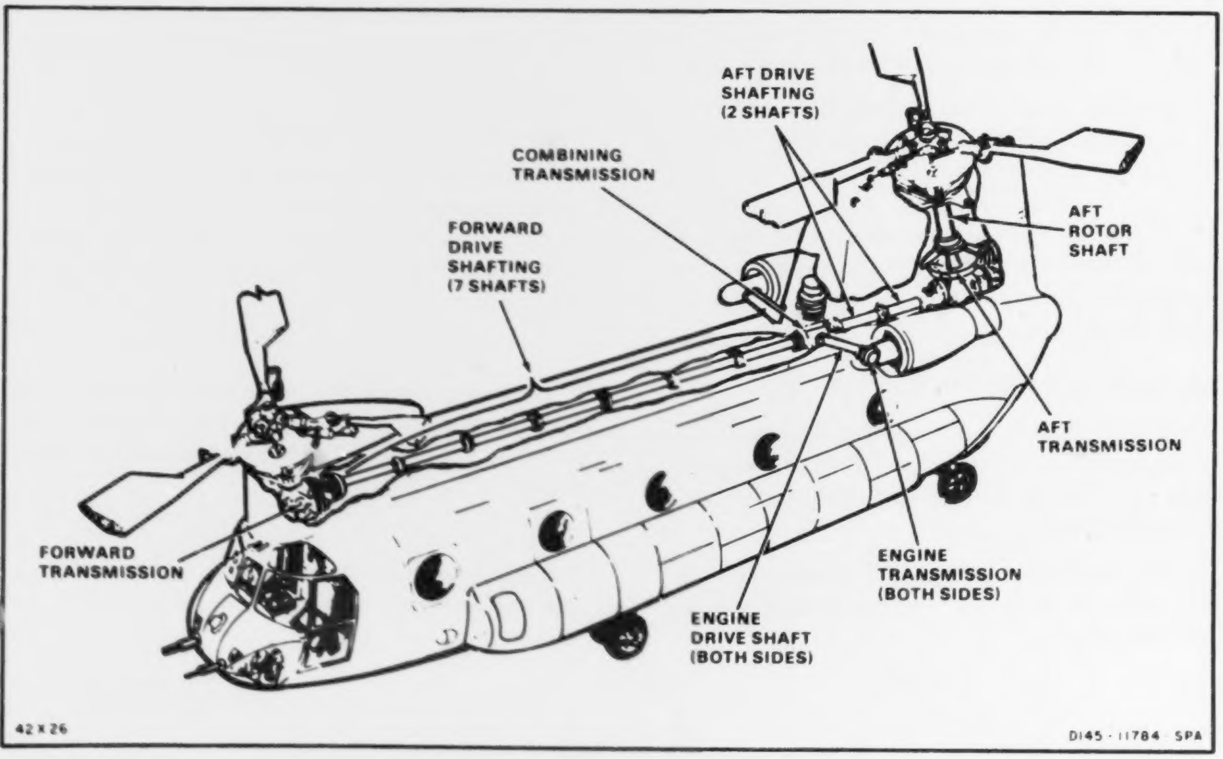
## DESCRIPTION AND OPERATION

## 6-1 DRIVE SYSTEM 6-1

The drive system delivers torque from the engines to the rotary-wing heads and blades. It also drives the ac generators and pumps for the flight control and utility hydraulic systems.

The drive system consists of five transmissions, drive shafting to connect the transmissions, and an aft rotor shaft:

1. An engine transmission is mounted on the front of each of the two engines. Torque is transmitted from the engine to the transmission by a splined quill shaft.
2. Output torque from each engine transmission is delivered through an engine drive shaft to the combining transmission. The combining transmission combines the torque from both engines and transmits it to a forward transmission and an aft transmission through drive shafting.
3. The forward transmission is splined directly to the rotary-wing head to drive the forward rotor blades.
4. The aft transmission drives a separate vertical aft rotor shaft. This shaft is splined to the aft rotary-wing head to drive the aft rotor blades.
5. The forward drive shafting consists of seven aluminum tubes joined by flexible adapter assemblies. The tubes are referred to as No. 1 thru No. 7, beginning at the forward end of the shafting. The shafting is supported in a bearing at each adapter assembly by two rubber and metal mounts.
6. The aft drive shafting consists of two aluminum tubes joined by a flexible adapter assembly. The tubes are referred to as No. 8 (forward) and No. 9 (aft). The shafting is supported in a bearing at the adapter assembly by two rubber and metal mounts.


AFT DRIVE SHAFTING (2 SHAFTS)
COMBINING TRANSMISSION
FORWARD DRIVE SHAFTING (7 SHAFTS)
AFT ROTOR SHAFT
AFT TRANSMISSION
FORWARD TRANSMISSION
ENGINE TRANSMISSION (BOTH SIDES)
ENGINE DRIVE SHAFT (BOTH SIDES)
42 X 26
D145 - 11784 - SPA

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### FORWARD DRIVE SHAFTING

The forward drive shafting transmits torque from the combining transmission to the forward transmission. It consists of seven shafts coupled by six adapter assemblies.

The shafts are numbered 1 thru 7, beginning with the forward shaft.

Shafts 1 thru 6 consist of an aluminum tube with an adapter riveted to each end. The forward adapter is a three-cornered aluminum forging. The aft adapter is a steel forging with external splines and internal threads. Shafts No. 2 thru 6 are identical and interchangeable.

The adapter assemblies between shafts consist of a pack of flexible steel plates bolted to a three-fingered steel adapter. Each adapter is held in a bearing and support assembly. The assemblies are internally splined to mate with the external splines on the shaft aft adapters. Each adapter assembly is indexed to its mating shaft and balanced as a unit with the shaft.

Shaft No. 7 is an aluminum tube with a three-cornered aluminum adapter riveted to each end.

The shafting is carried on the helicopter structure on two rubber and metal mounts at each of the six bearing and support assemblies.

Separate adapter assemblies couple the shafting to the forward and combining transmissions. Access to the shafting is through covers on the top of the fuselage.

### AFT DRIVE SHAFTING

The aft drive shafting transmits torque from the combining transmission to the aft transmission. It consists of two individual shafts coupled by an adapter assembly.

The two shafts are numbered 8 (forward) and 9 (aft), to continue the numbering of the forward drive shafting.

Shaft No. 8 consists of an aluminum tube with an adapter riveted to each end. The forward adapter is a three-cornered aluminum forging. The aft adapter is a steel forging with external splines and internal threads.

The adapter assembly consists of a pack of flexible steel plates bolted to a three-fingered steel adapter. The assembly is held in a bearing and support assembly that is internally splined to mate with the external splines on the aft adapter of shaft No. 8. The adapter assembly is indexed to shaft No. 8 and balanced as a unit with the shaft.

Shaft No. 9 is an aluminum tube with a three-cornered aluminum adapter riveted to each end.

The shafting is carried on the helicopter structure on two rubber and metal mounts of the bearing and support assembly.

Separate adapter assemblies couple the shafting to the combining and aft transmissions. Access to the shafting is from inside the cabin.

### ENGINE DRIVE SHAFTS

An engine drive shaft transmits torque from each engine transmission to the combining transmission. The shaft consists of an aluminum tube with a three-cornered aluminum adapter riveted to each end.

Each shaft is connected to the transmissions by an adapter assembly at each end. Each shaft is serial numbered and dynamically balanced as a unit with the two adapter assemblies.

Access to each shaft is through a fairing between the engine transmission and combining transmission.

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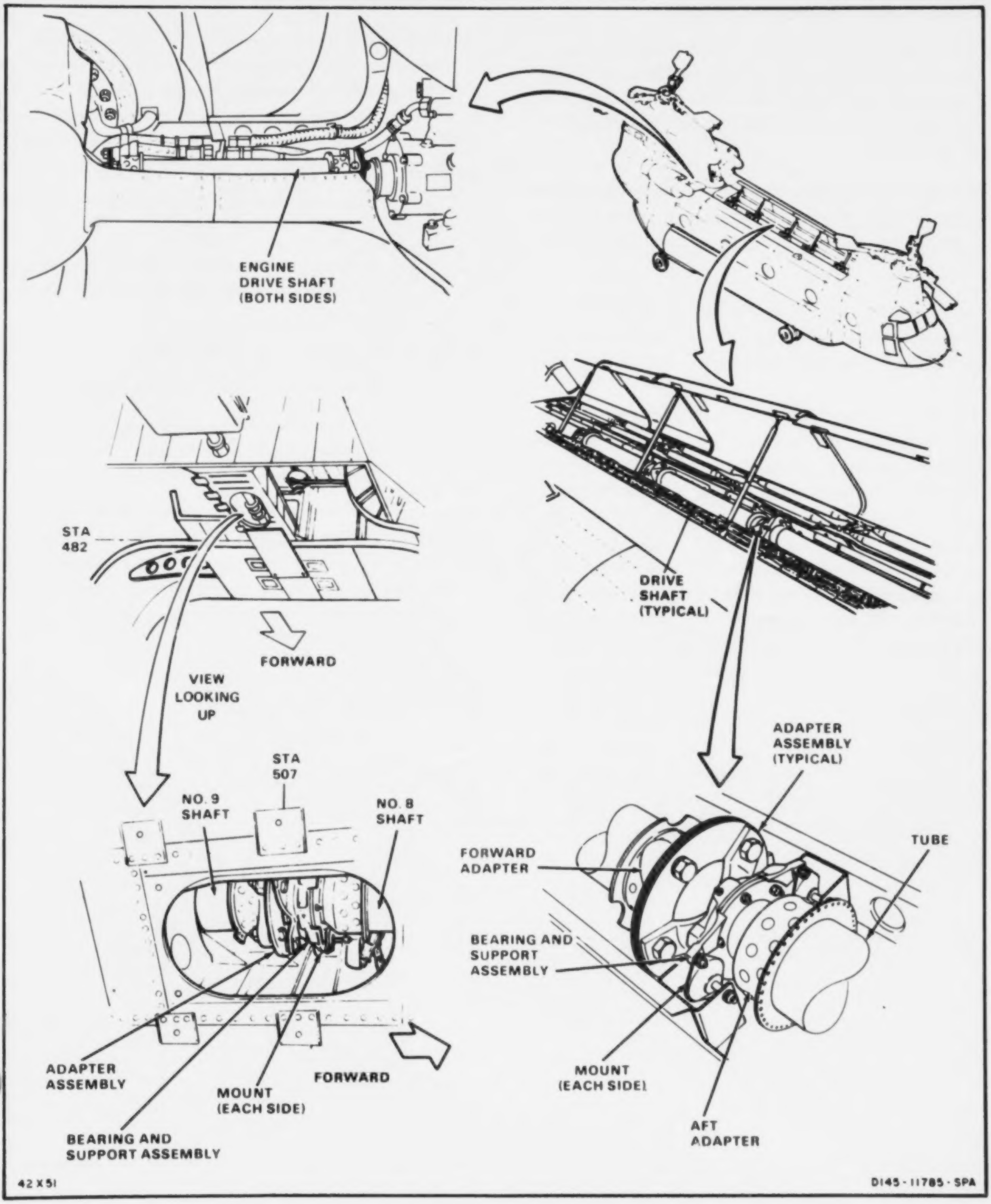
## 6-1 DRIVE SYSTEM (Continued) 6-1


ENGINE DRIVE SHAFT (BOTH SIDES)
STA 482
FORWARD
VIEW LOOKING UP
DRIVE SHAFT (TYPICAL)
ADAPTER ASSEMBLY (TYPICAL)
STA 507
NO. 9 SHAFT
NO. 8 SHAFT
TUBE
FORWARD ADAPTER
BEARING AND SUPPORT ASSEMBLY
ADAPTER ASSEMBLY
FORWARD
MOUNT (EACH SIDE)
BEARING AND SUPPORT ASSEMBLY
MOUNT (EACH SIDE)
AFT ADAPTER
42X51
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## FORWARD TRANSMISSION

The forward transmission receives input torque from the combining transmission through the forward drive shafting. It transmits it directly to the forward rotary-wing head and blades through an integral shaft.

A slider shaft is mounted around the integral shaft and bolted to the top of the transmission. It provides the bearing surface for swashplate motion.

An integral spur gear at the bottom of the transmission provides power to drive a pump for the flight control hydraulic system.

The transmission is bolted to structure directly above the cockpit. It is part of a package that can be removed and installed as an assembly. In addition to the transmission, the package includes the rotary-wing head and head controls, a weather-protective cover, and two flight control bellcranks. Access to the top of the transmission is through hinged work platforms at each side of the forward transmission fairing. Access to the bottom of the transmission is through a removable drip pan.

### Lubrication System

The forward transmission is lubricated with oil from a sump at the bottom of the transmission. Oil is circulated by main and auxiliary pumps mounted on the bottom of the transmission. The main pump is externally mounted. The auxiliary pump is covered by the sump.

The lubrication system is monitored and protected by the following:

- A combined indicating screen and chip detector, and temperature sensor on the sump.
- A pump inlet screen inside the sump.
- A main filter inside the main pump.
- Main and auxiliary pressure switches, an auxiliary filter, and an inlet screen on the left side of the transmission.

Hot oil from the transmission passes through a circular oil cooler mounted on the aft end of the transmission. The oil is cooled by air forced through the cooler by an impeller. The impeller fits within the cooler and is splined to the transmission input shaft.

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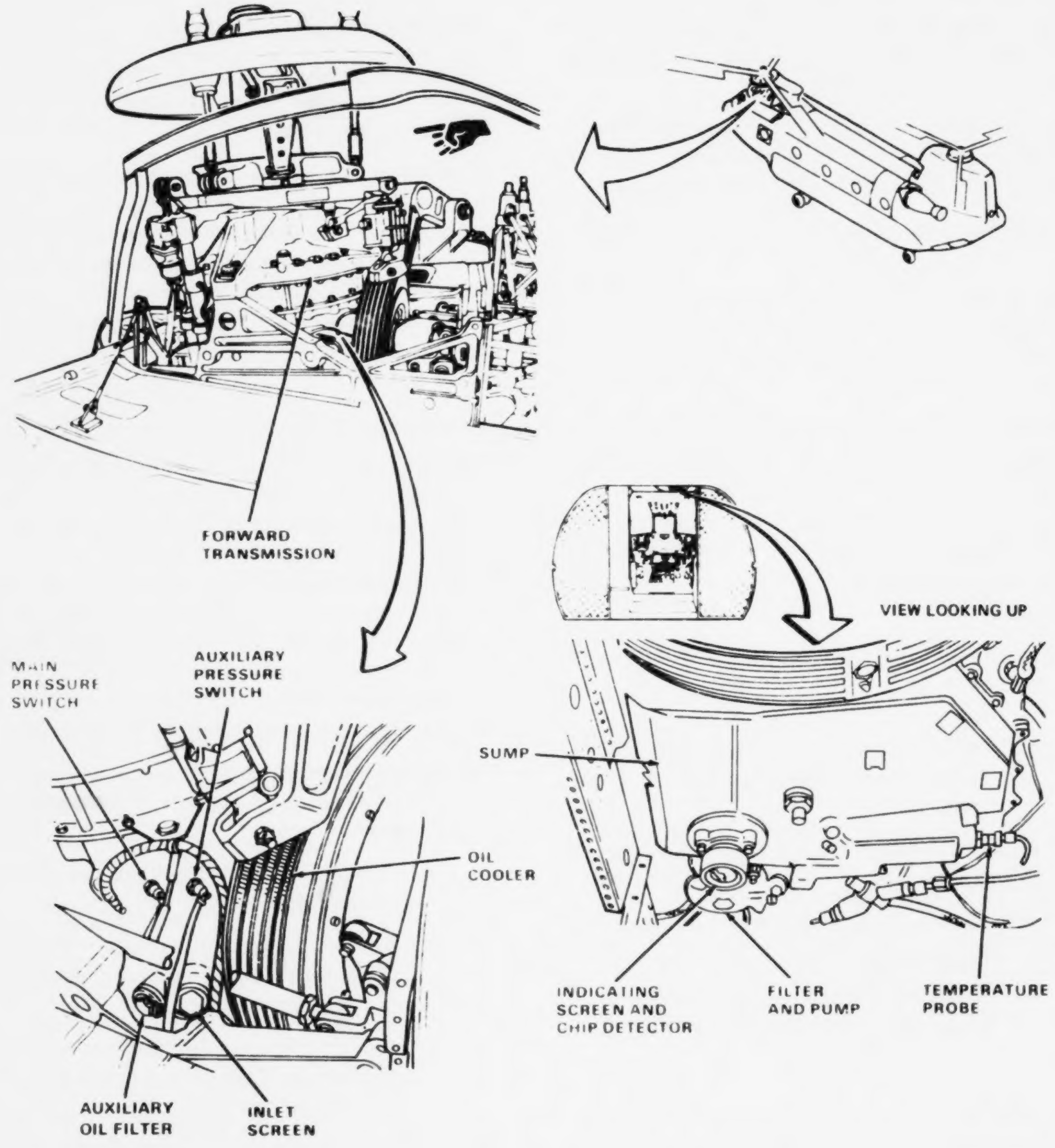
FORWARD TRANSMISSION
VIEW LOOKING UP
MAIN PRESSURE SWITCH
AUXILIARY PRESSURE SWITCH
OIL COOLER
SUMP
INDICATING SCREEN AND CHIP DETECTOR
FILTER AND PUMP
TEMPERATURE PROBE
AUXILIARY OIL FILTER
INLET SCREEN
285

*GO TO NEXT PAGE*

## COMBINING TRANSMISSION

The combining transmission receives input torque from the two engine transmissions through the engine drive shafts. It combines the torque and transmits it to the forward and aft drive shafting through output shafts.

The transmission is bolted to the airframe in the lower forward part of the pylon. Access is through hinged fairings at the forward end of the pylon.

### Lubrication System

The combining transmission contains an integrated lubrication system that supplies the combining transmission and both engine transmissions.

Oil for the system is contained in a sump bolted to the top of the transmission. The sump is divided into three sections, for the combining transmissions and the two engine transmissions. Oil is circulated by a main and an auxiliary oil pump inside the transmission.

The lubrication system is monitored and protected by the following:

- Two debris detection screens and a chip detector at the lower forward end of the transmission.
- An inlet screen and a main filter on the sump cover.
- A temperature probe at the forward end of the sump.
- An auxiliary filter and a pressure switch at the forward end of the transmission.

Hot oil from the transmission passes through a circular oil cooler mounted on the sump cover under oil coolers for the left and right engine transmission. The oil is cooled by a fan that pulls air through the coolers. The fan is driven by a vertical shaft that is driven by a gear on the aft output shaft of the transmission.

## ENGINE TRANSMISSION

The engine transmissions turn the direction of engine torque 90 degrees to direct it towards the combining transmission.

A one-way clutch in each transmission allows the drive system to turn faster than its engine during autorotation or a sudden reduction in engine rpm. Each of the two engine transmissions is the same except for the location of some external parts. Either transmission can be converted to one for the opposite side by exchanging the location of these parts.

### Lubrication System

Each engine transmission is lubricated by oil from a section of the combining transmission sump. Oil is delivered to each transmission by a separate oil pump in the combining transmission.

Oil is carried between the combining transmission and each engine by two external oil hoses. A vent hose carries oil vapor from the transmission to the combining transmission sump.

The lubrication system is monitored and protected by the following for each engine transmission:

- A temperature probe and a debris detection screen on the side of the combining transmission.
- A main filter on the back of the combining transmission.
- An inlet screen and a pressure switch on the airframe above and aft of the combining transmission.
- A combined chip detector and overtemperature switch at the bottom of the engine transmission.

Hot oil from each engine transmission is cooled in a separate oil cooler mounted on the combining transmission sump cover.

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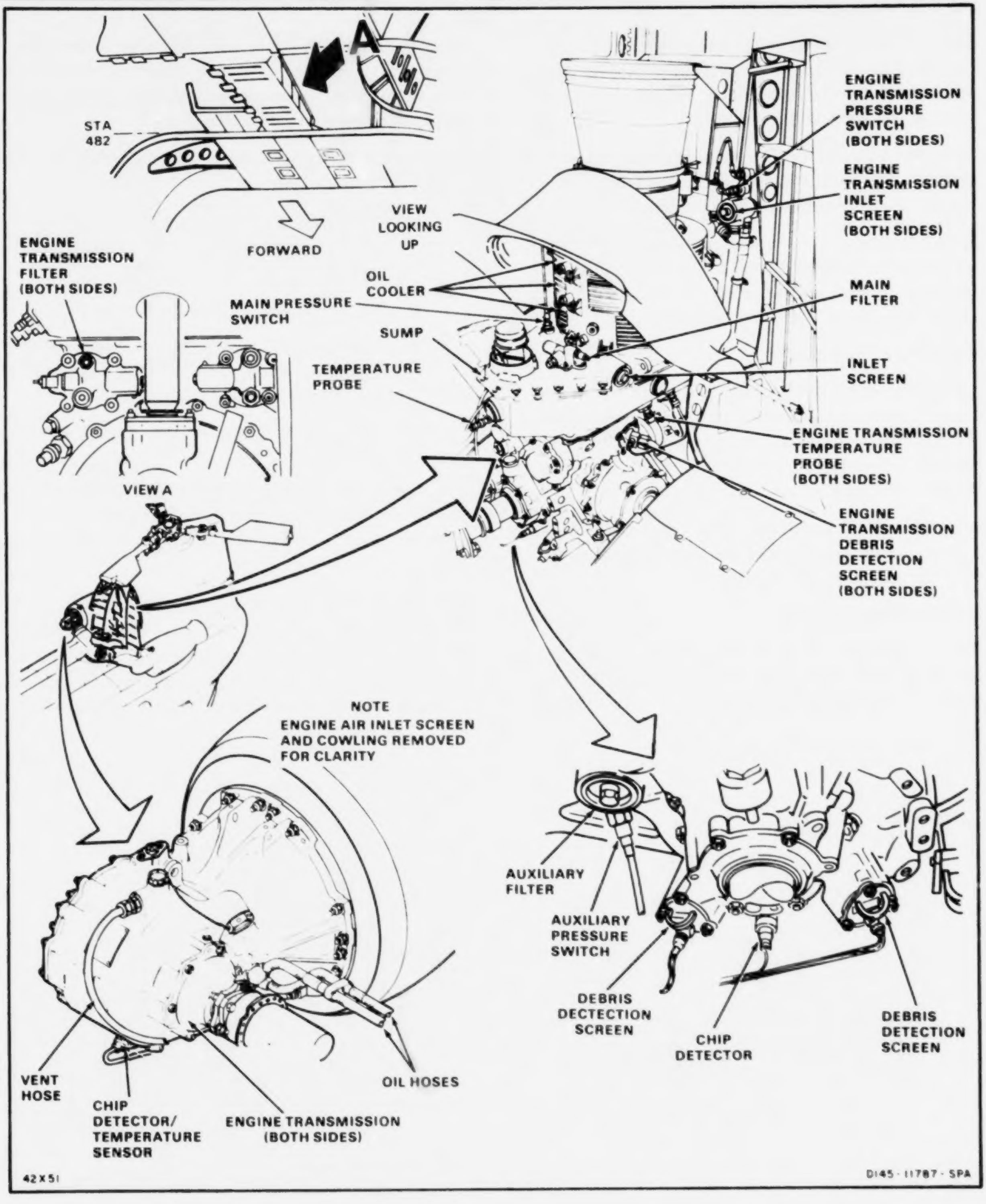
A
STA 482
FORWARD
ENGINE TRANSMISSION FILTER (BOTH SIDES)
VIEW A
VIEW LOOKING UP
OIL COOLER
MAIN PRESSURE SWITCH
SUMP
TEMPERATURE PROBE
ENGINE TRANSMISSION PRESSURE SWITCH (BOTH SIDES)
ENGINE TRANSMISSION INLET SCREEN (BOTH SIDES)
MAIN FILTER
INLET SCREEN
ENGINE TRANSMISSION TEMPERATURE PROBE (BOTH SIDES)
ENGINE TRANSMISSION DEBRIS DETECTION SCREEN (BOTH SIDES)
NOTE
ENGINE AIR INLET SCREEN AND COWLING REMOVED FOR CLARITY
AUXILIARY FILTER
AUXILIARY PRESSURE SWITCH
DEBRIS DECTECTION SCREEN
CHIP DETECTOR
DEBRIS DETECTION SCREEN
VENT HOSE
CHIP DETECTOR/ TEMPERATURE SENSOR
ENGINE TRANSMISSION (BOTH SIDES)
OIL HOSES
42X51
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### AFT TRANSMISSION

The aft transmission receives input torque from the combining transmission through the aft drive shafting. It transmits torque to the aft rotor shaft through a splined connection.

Spur gears in the transmission provide power to drive pumps for the flight control and utility hydraulic systems and two ac generators.

The transmission is mounted above the ramp area of cabin at the base of the pylon. Access is through hinged baffles and a removable drip tray at the bottom of the transmission.

### AFT ROTOR SHAFT

The aft rotor shaft is splined to the top of the aft transmission. It transmits input torque from the transmission to the aft rotary-wing head and rotor blades. The shaft turns in a bearing that is part of a support bolted to the pylon structure.

A slider shaft is mounted on the rotor shaft and bolted to the support. It provides the bearing surface for aft swashplate motion.

#### Lubrication System

A slider shaft is mounted around the rotor shaft and bolted to the support. It provides the bearing surface for aft swashplate motion.

Oil is circulated by main and auxiliary pumps. The main pump is at the aft end of the transmission. The auxiliary pump is at the bottom of the transmission, covered by the sump.

The lubrication system is monitored and protected by the following:

- A combined indicating screen and chip detector, and a temperature sensor on the sump.
- An inlet screen inside the sump.
- Main and auxiliary pressure switches, a main inlet screen and an auxiliary filter on the left side of the transmission.
- A main filter at the aft left of the transmission.

In addition, the condition of oil at the aft rotor shaft bearing is monitored by a chip detector, a pressure switch, and a filter in the shaft support.

Hot oil from the transmission and rotor shaft passes through a circular oil cooler mounted on the aft end of the transmission. The oil is cooled by a fan that pulls air through the cooler. The fan is driven by the transmission through a splined shaft.

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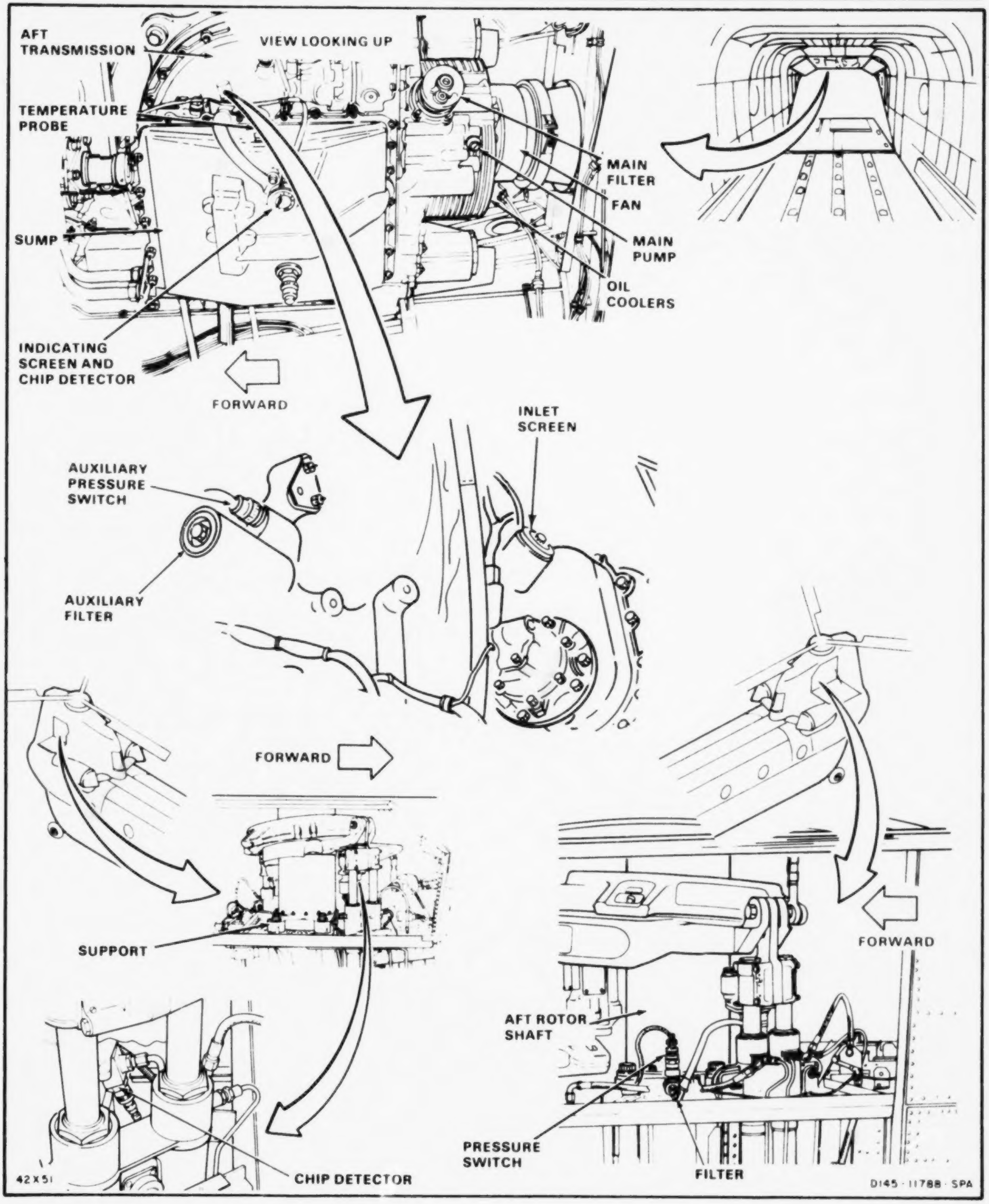

AFT TRANSMISSION
VIEW LOOKING UP
TEMPERATURE PROBE
MAIN FILTER
FAN
SUMP
MAIN PUMP
OIL COOLERS
INDICATING SCREEN AND CHIP DETECTOR
FORWARD
INLET SCREEN
AUXILIARY PRESSURE SWITCH
AUXILIARY FILTER
FORWARD
SUPPORT
FORWARD
AFT ROTOR SHAFT
PRESSURE SWITCH
FILTER
CHIP DETECTOR
42X51
D145 - 11788 - SPA

**END OF TASK**

# SECTION II

# DRIVE SHAFTING

## 6-2 REMOVE NO. 1 DRIVE SHAFT 6-2

INITIAL SETUP

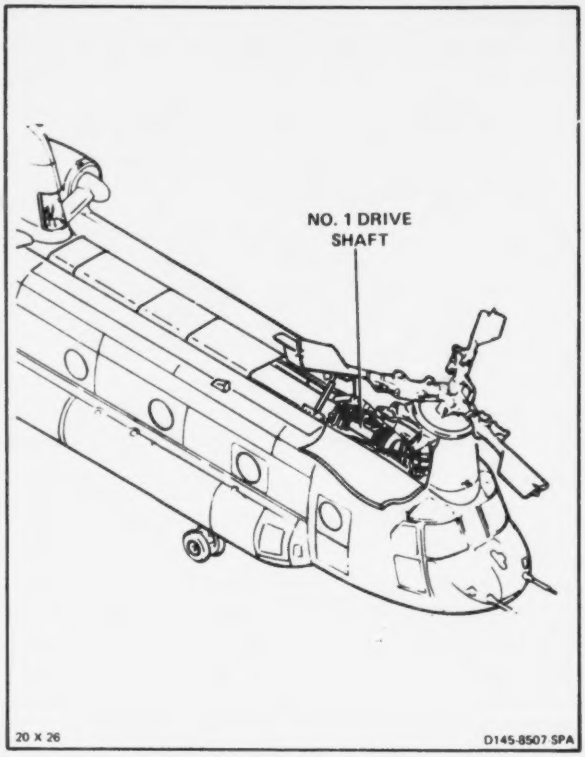
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Barrier Material (E80)
Cloths (E120)

***Personnel Required:***
Medium Helicopter Repairer (2)

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Forward Transmission Aft Fairing Removed (Task 2-63)
Forward Transmission Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 2 Drive Shaft Removed (Task 6-3)



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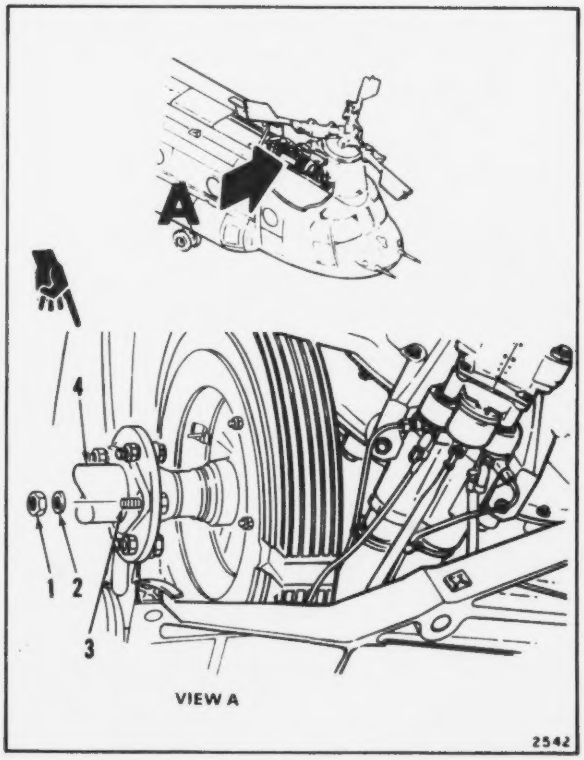
**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.**

1. **Remove nuts (1) and washers (2)** from three bolts (3) at forward end of shaft (4). During removal, hold head of bolts with a wrench. Do not remove bolts at this time.



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## 6-2 REMOVE NO. 1 DRIVE SHAFT (Continued) 6-2

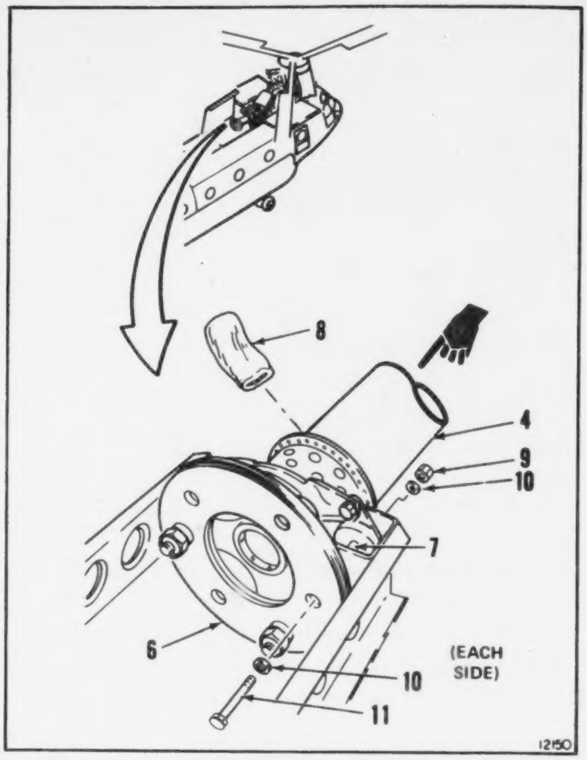
**WARNING**

**Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.**

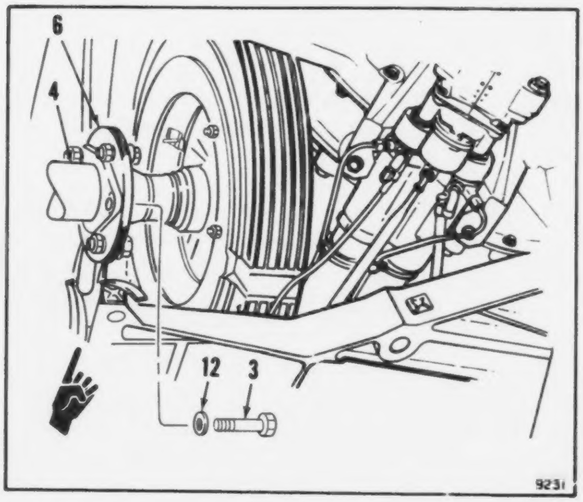
**NOTE**

Remove bolt from mount at each side of adapter assembly in same way. Right side shown here.

2. Rotate shaft (4) to align one of the bolt holes in adapter assembly (6) with mount bushing (7).
3. Support shaft (4) with cloths (E120) or barrier material (E80) (8).
4. **Remove** nut (9), washers (10), and bushing **bolt (11).** Remove bolt through bolt hole in adapter assembly (6). Use socket and extension.



5. **Remove three bolts (3)** and special washers (12) from shaft (4) and forward transmission adapter assembly (6).



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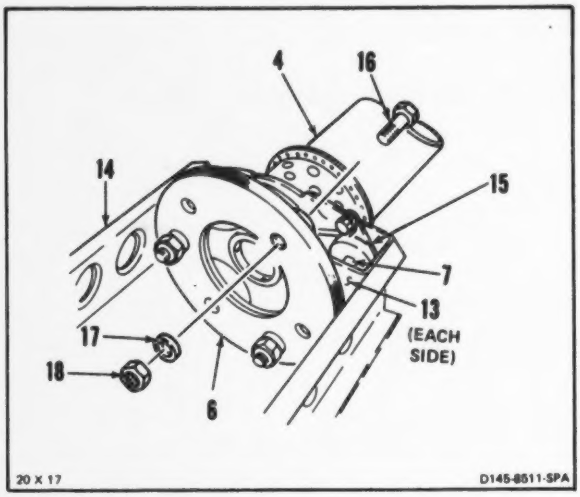
## 6-2 REMOVE NO. 1 DRIVE SHAFT (Continued) 6-2

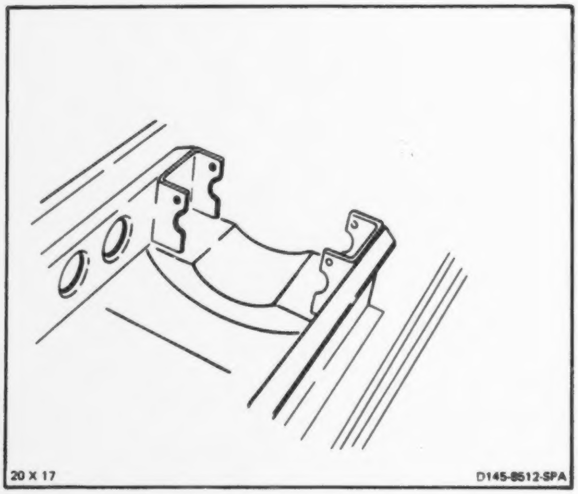
6. Lift adapter assembly (6) out of two brackets (13). With aid of helper, withdraw shaft (4) from helicopter structure (14). **Remove shaft** from helicopter.

7. If shaft (4) is being replaced, remove bushing (7) from mount (15) on each side of adapter assembly (6). Install bolt (16), special washer (17) and nut (18) in adapter assembly.


4
16
14
15
7
13
(EACH SIDE)
17
18
6
20 X 17
D145-8511-SPA

FOLLOW-ON MAINTENANCE:

None


20 X 17
D145-8512-SPA

**END OF TASK**

## 6-3 REMOVE NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT 6-3

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Barrier Material (E80)
Cloths (E120)

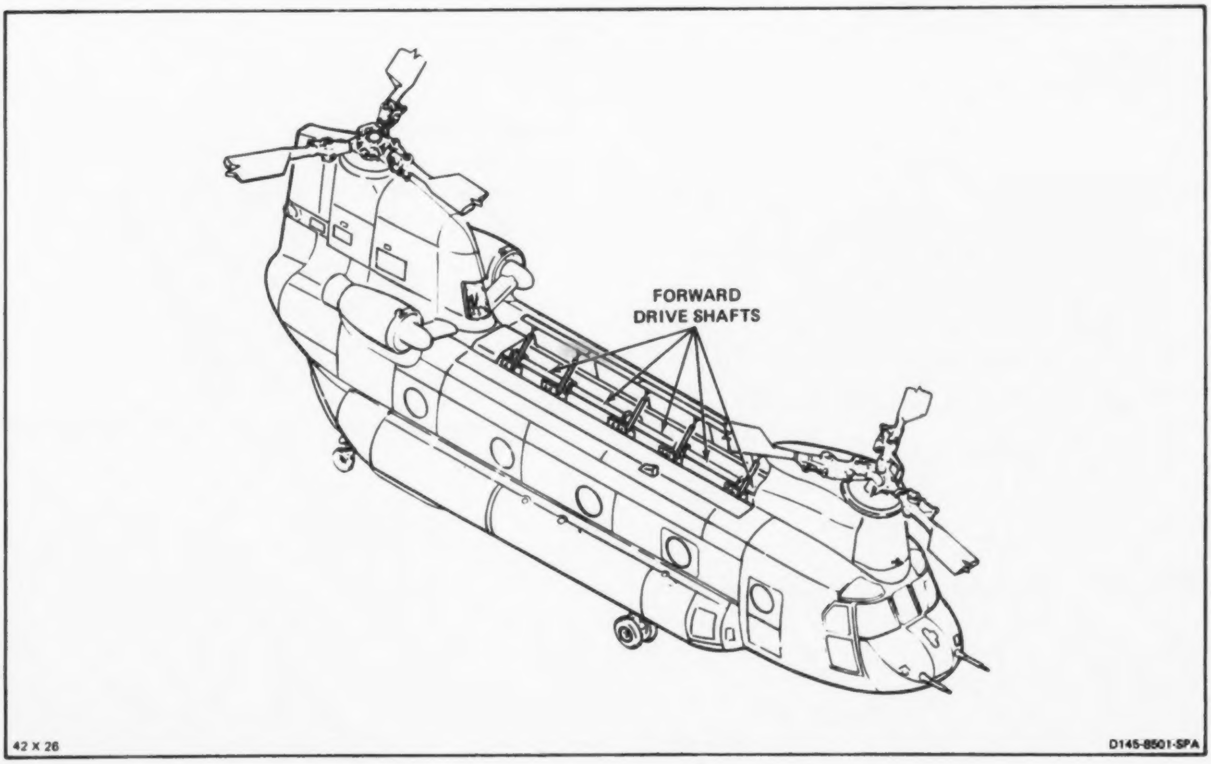
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Drive Shaft Tunnel Access Covers Open, As Needed (Task 2-2)

***General Safety Instructions:***

**WARNING**

**Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.**



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## 6-3 REMOVE NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-3

**NOTE**

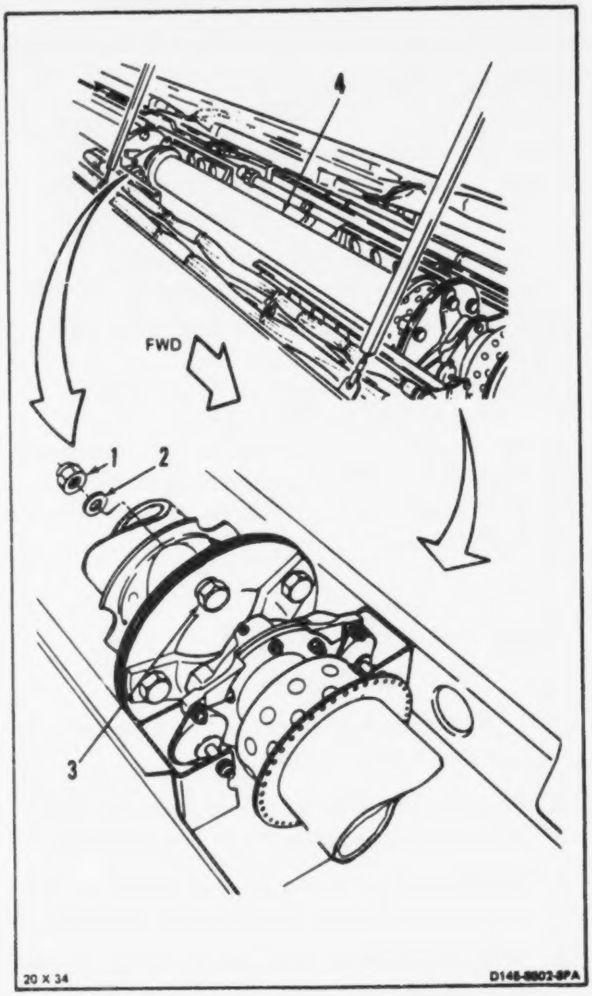
Remove any of shafts No. 2 thru No. 6 in same way. Typical shaft shown here.

***REMOVE END NUTS***

**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.**

1. **Remove nuts (1) and washers (2)** from three bolts (3) **at each end of shaft (4).** During removal, hold head of bolts with wrench. **Do not remove bolts** at this time.



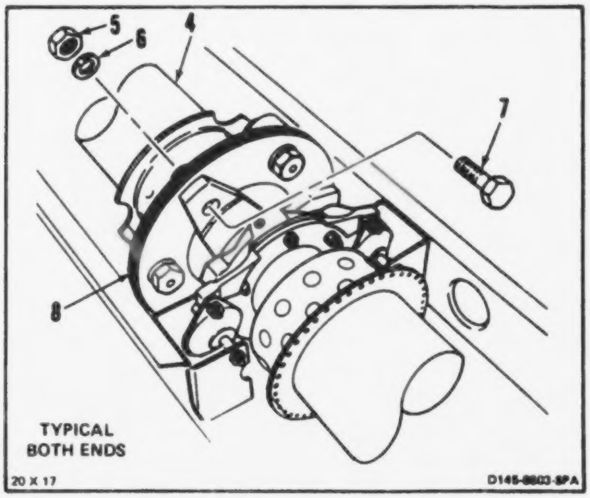
**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.**

**NOTE**

If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

2. **Remove one nut (5), special washer (6), and bolt (7)** from adapter assembly (8) **at each end of shaft (4).** During removal, hold head of bolts with wrench.



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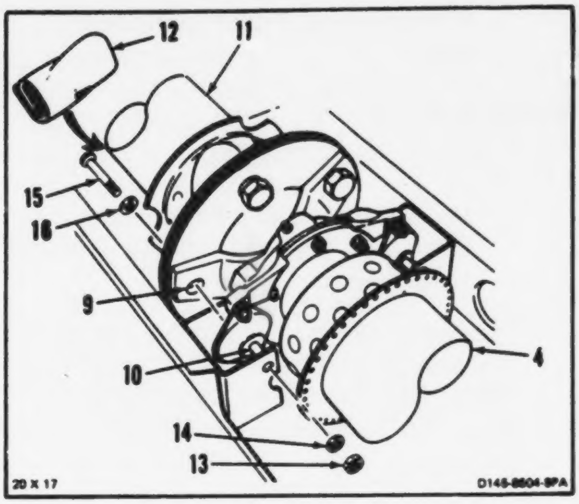
## 6-3 REMOVE NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-3

### *REMOVE MOUNT BOLTS*

**NOTE**

- Remove bolt from mount at each side of adapter assembly in same way. Right mount shown here.
- All shafts must be rotated as a unit to keep blades in phase.

3. Rotate shaft (4) to align bolt hole (9) with mount bushing (10).
4. Support shaft (11) with pad (12) of cloths (E120) or barrier material (E80).
5. Remove nut (13) and washer (14) from bushing bolt (15). **Remove bushing bolt** and washer (9) through bolt hole (9). Use socket and extension.

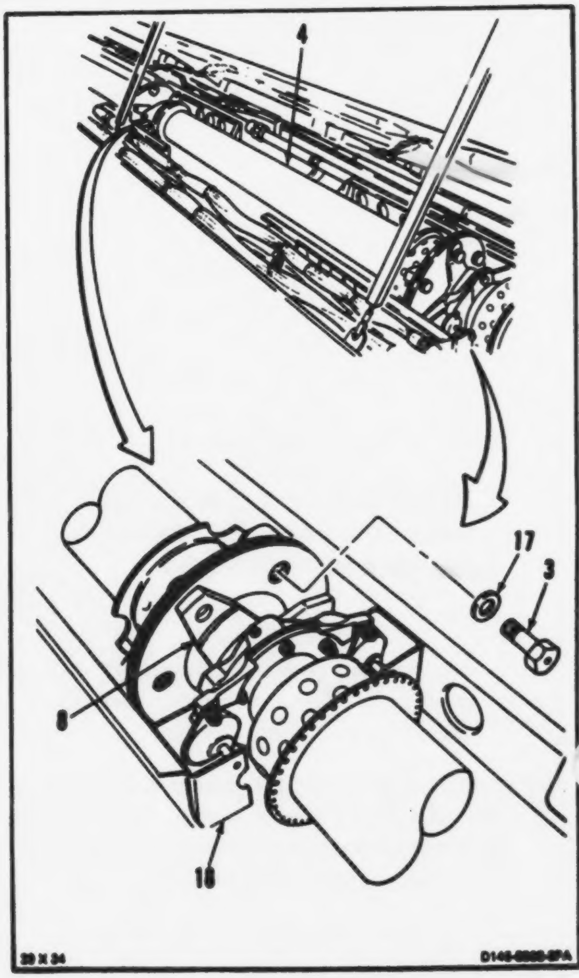


### *REMOVE SHAFT*

**NOTE**

All shafts must be rotated as a unit to keep blades in phase.

6. Rotate shaft (4) to **position two bolt holes** in adapter assemblies (8) **at top of shaft.**
7. **Remove three bolts (3)** and special washers (17) **from each end of shaft (4).**
8. With aid of helper, lift shaft (4) from brackets (18). **Remove shaft.**



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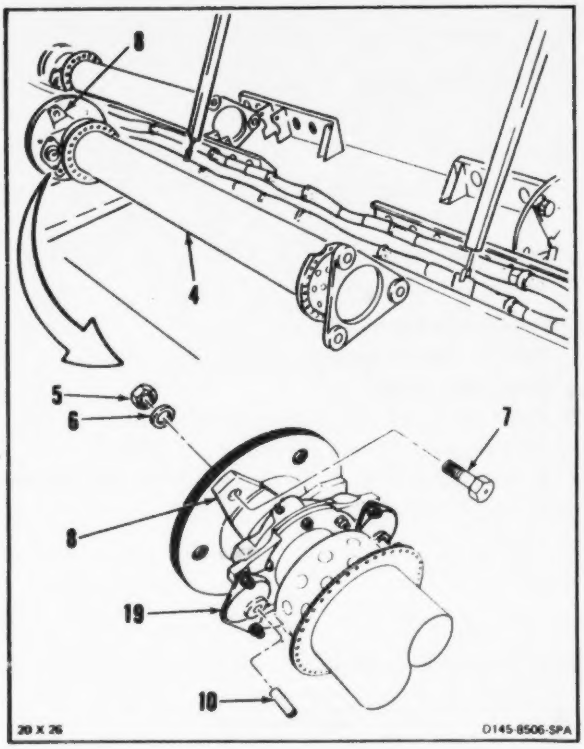
## 6-3 REMOVE NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-3

9. If shaft (4) is being replaced, install bolt (7), special washer (6) and nut (5) in adapter assembly (8). Remove bushing (10) from mount (19) on each side of adapter assembly.

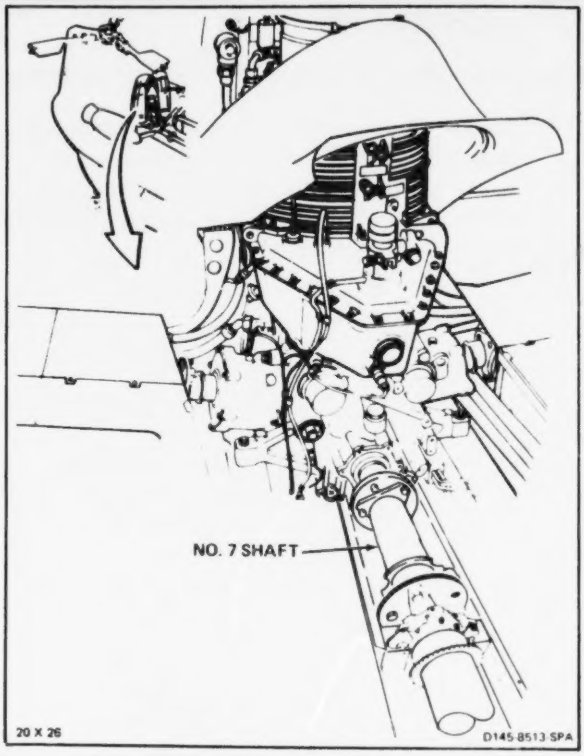

8
4
5
6
7
8
19
10
20 X 26
0145-8506-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-4 REMOVE NO. 7 DRIVE SHAFT 6-4



INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Barrier Material (E80)
Cloths (E120)

***Personnel Required:***
Medium Helicopter Repairer (2)

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Raised (Task 2-2)
Forward Drive Shaft Tunnel No. 6 Access Cover Open (Task 2-2)

---

**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.**

**NOTE**

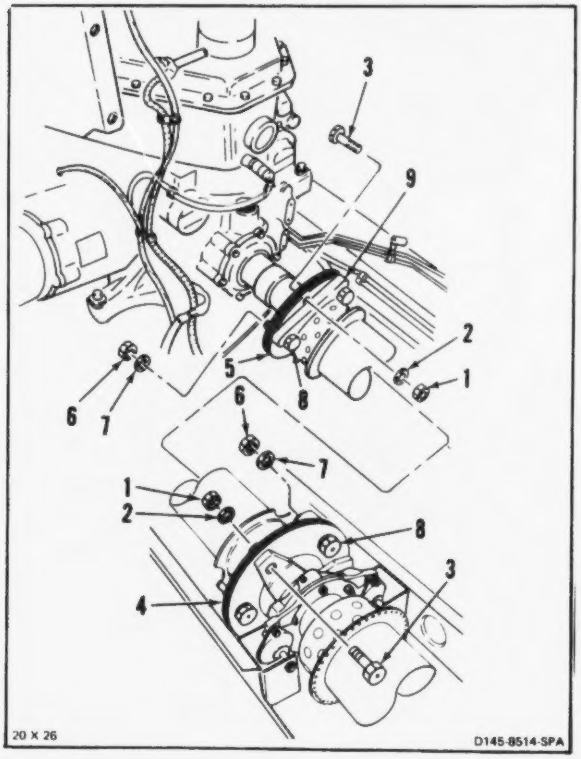
If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

1. **Remove one nut (1), special washer (2), and bolt (3) from adapter assemblies (4 and 5).** During removal, hold head of bolts with wrench.

**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.**

2. **Remove three nuts (6) and washers (7)** from bolts (8) **at each end of shaft (9).** During removal, hold head of bolts with wrench. **Do not remove bolts** at this time.



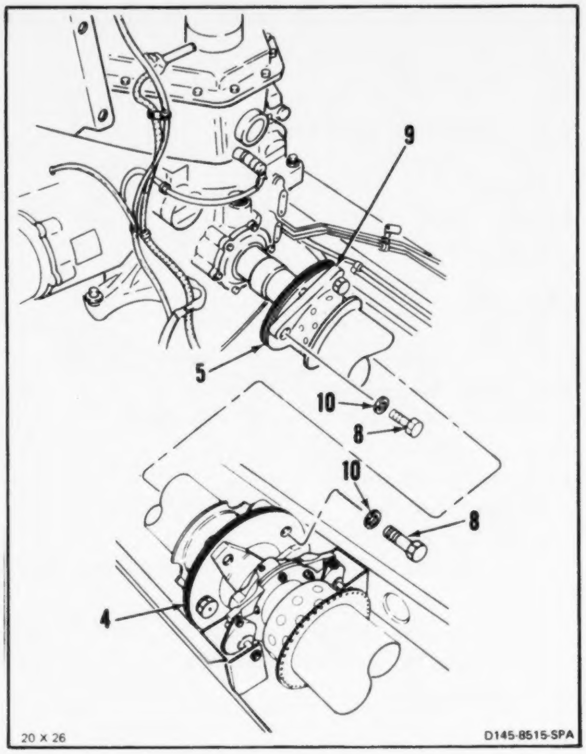
***GO TO NEXT PAGE***

## 6-4 REMOVE NO. 7 DRIVE SHAFT (Continued) 6-4

**NOTE**

All shafts must be rotated as a unit to keep blades in phase.

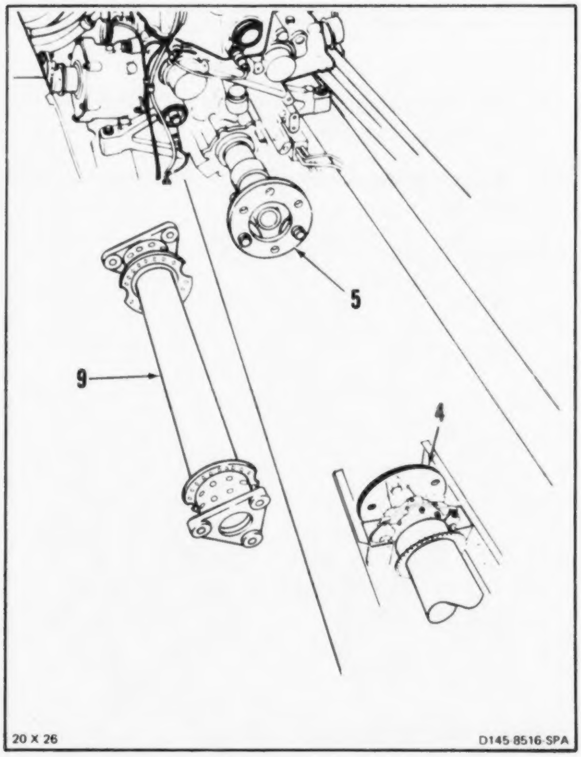
3. Rotate shaft (9) to position two bolt holes in adapter assemblies (4 and 5) at top of shaft.
4. Support shaft (9) with cloths (E120) or barrier material (E80).
5. **Remove three bolts (8)** and washers (10) **from each end of shaft (9).**


9
5
10
8
10
8
4
20 X 26
D145-8515-SPA

6. With aid of helper lift shaft (9) from between adapter assemblies (4 and 5). **Remove shaft.**

FOLLOW-ON MAINTENANCE:

None


5
9
4
20 X 26
D145-8516-SPA

**END OF TASK**

## 6-5 REMOVE FORWARD TRANSMISSION ADAPTER ASSEMBLY 6-5

INITIAL SETUP

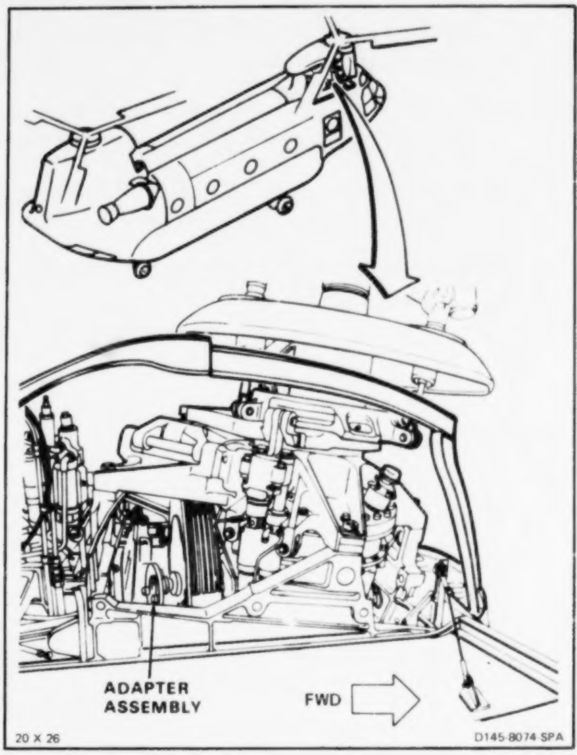
***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

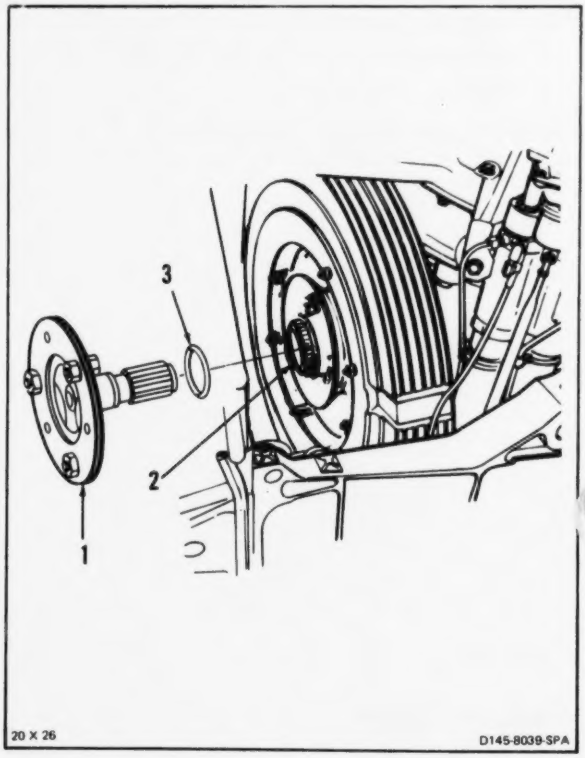
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Right Fairing Open (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)


ADAPTER ASSEMBLY
FWD
20 X 26
D145-8074-SPA

1. **Remove adapter assembly (1)** from transmission input shaft (2).
2. **Remove packing (3)** from adapter assembly (1).

FOLLOW-ON MAINTENANCE:

None


3
2
1
20 X 26
D145-8039-SPA

**END OF TASK**

## 6-6 REMOVE COMBINING TRANSMISSION FORWARD ADAPTER ASSEMBLY 6-6

INITIAL SETUP

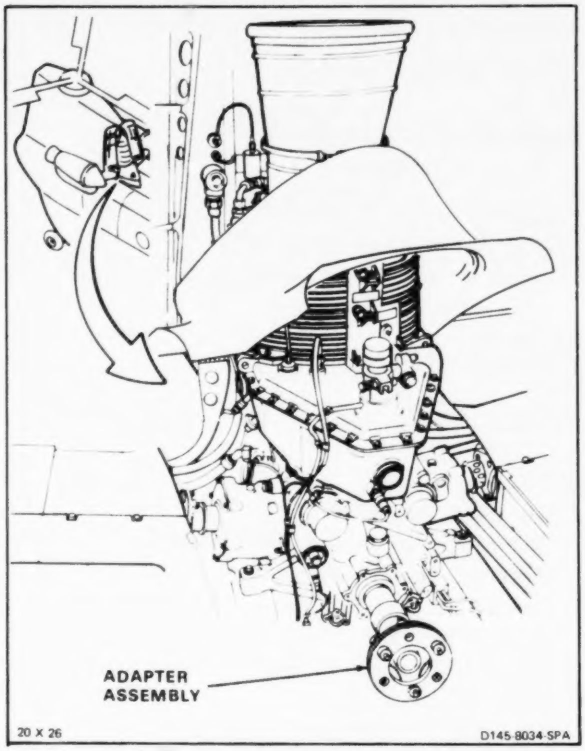
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wood Dowel, 1 Inch x 18 Inches

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

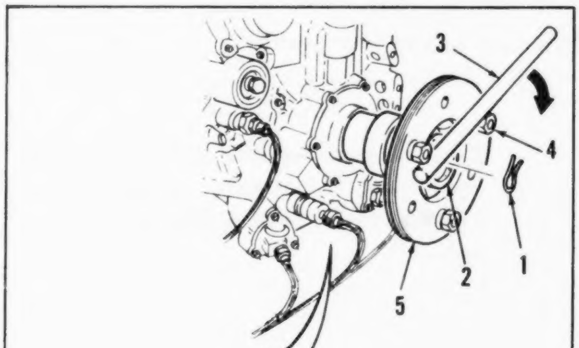
***Equipment Condition:***
Battery Disconnected
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)
No. 7 Drive Shaft Removed (Task 6-4)



1. **Remove lockring (1)** from retainer (2).
2. Place wood dowel (3) across nuts (4) as shown. Hold dowel to keep adapter assembly (5) from turning. **Remove retainer (2).**
3. **Remove adapter assembly (5) and retainer (6)** from output shaft (7).

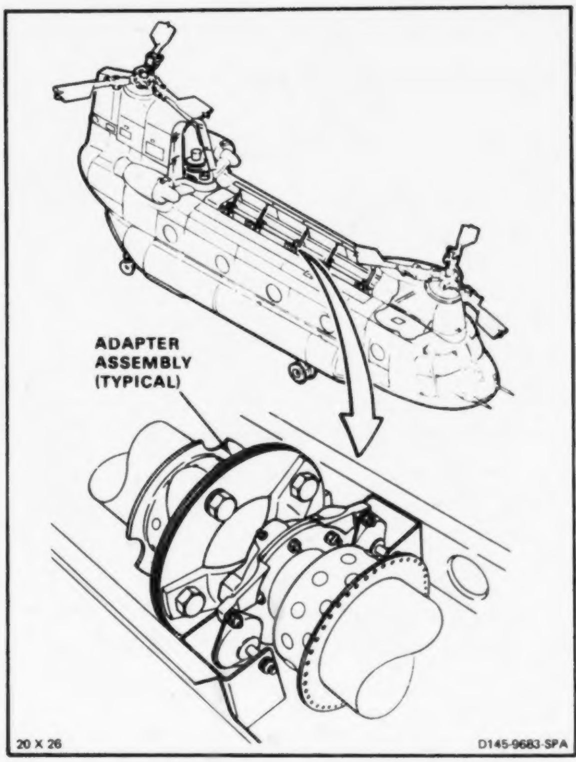
FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-7 INSPECT FORWARD DRIVE SHAFT ADAPTER ASSEMBLY



INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4962

***Materials:***
Crocus Cloth (E122)

***Personnel Required:***
67U30 Inspector

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)
Forward Transmission Fairing Work Platforms Open (Task 2-2)
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)

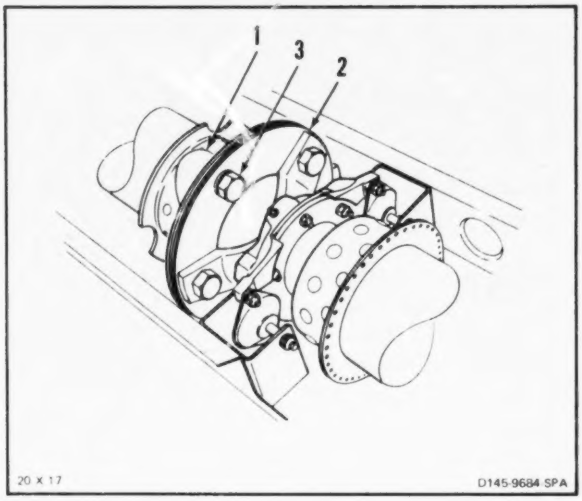
***General Safety Instructions:***

**WARNING**

**Keep clear of turning rotor blades when rotating adapter assembly. Turning blades can injure personnel.**

***GO TO NEXT PAGE***

## 6-7 INSPECT FORWARD DRIVE SHAFT ADAPTER ASSEMBLY *(Continued)* 6-7



**NOTE**

- Inspect all adapter assemblies in same way. Typical assembly shown.
- Use magnifying glass to inspect.
- Rotate adapter assembly as needed for complete check.

1. **Inspect adapter (1) and plates (2) for cracks.** Pay special attention to areas around bolts (3). There shall be no cracks.
2. **Inspect adapter (1). There shall be no nicks, scratches or gouges.**
3. **Inspect plates (2). There shall be no sharp dents or distorting. There shall be no nicks on inside edge.** Feel for nicks with pointed scriber.
4. **Inspect outside edge of plates (2) for light scratches, fretting corrosion or nicks.** Repair damage (Task 6-11). Use crocus cloth (E122).

FOLLOW-ON MAINTENANCE:

Close aft pylon lower fairing (Task 2-2).

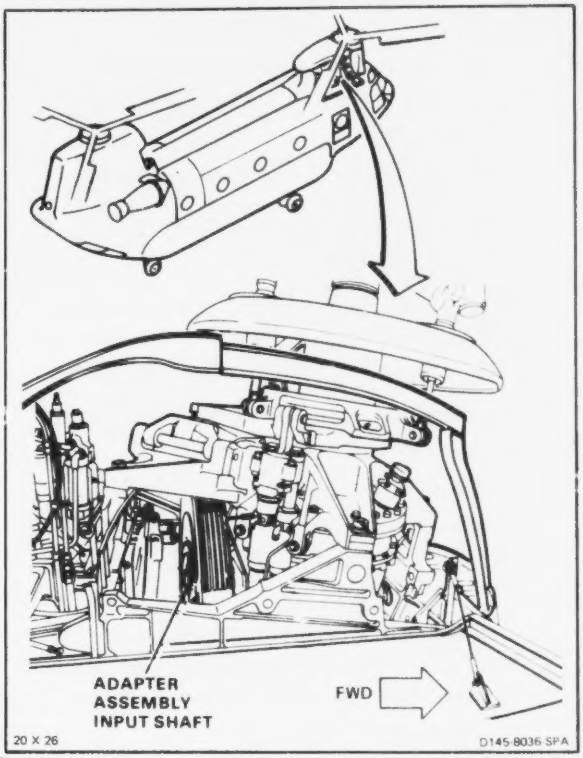
Close aft pylon doors (Task 2-2).

Close forward transmission fairing work platforms (Task 2-2).

Close forward drive shaft tunnel access covers (Task 2-2).

**END OF TASK**

## 6-8 INSTALL FORWARD TRANSMISSION ADAPTER ASSEMBLY 6-8



INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
Dry Cleaning Solvent (E162)
Grease (E190)
Cloth (E120)
Gloves (E186)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

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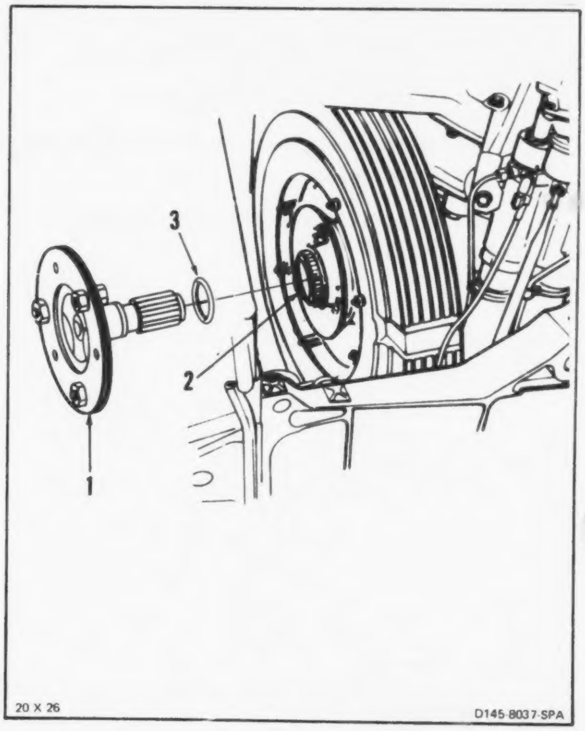
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.**

1. Clean splines of adapter assembly (1) and input shaft (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).
2. Coat packing (3) with grease (E190). **Install packing** on adapter assembly (1).
3. **Pack splines** of input shaft (2) and adapter assembly (1) **with grease (E190).**
4. **Install adapter assembly (1)** in input shaft (2). Make sure assembly is fully seated. Wipe off excess grease with cloth (E120).



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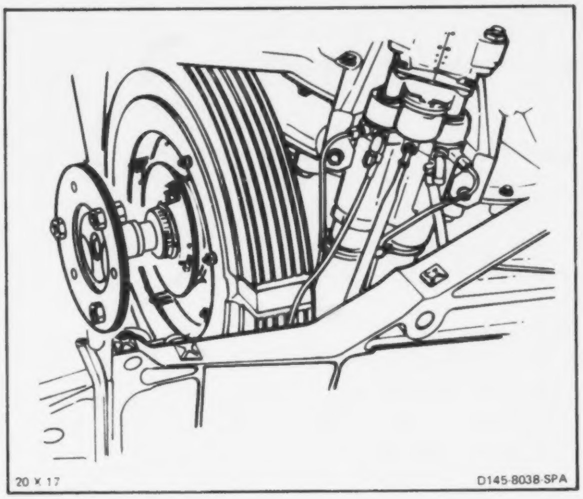
## 6-8 INSTALL FORWARD TRANSMISSION ADAPTER ASSEMBLY (Continued) 6-8



FOLLOW-ON MAINTENANCE:

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).

Phase rotary-wing blades (Task 6-28).

Install forward transmission oil cooler air inlet duct (Task 6-122).

Close forward transmission right fairing (Task 2-2).

**END OF TASK**

# 6-9 INSTALL COMBINING TRANSMISSION FORWARD ADAPTER ASSEMBLY

INITIAL SETUP

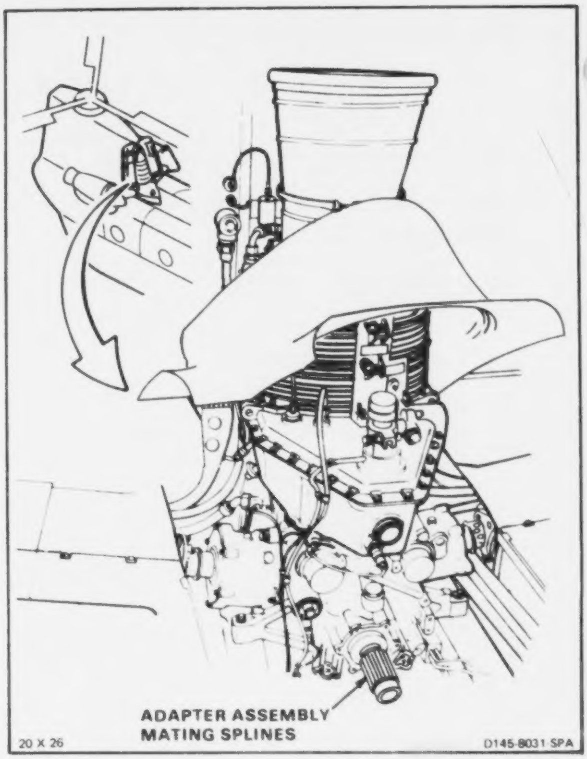
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Wood Dowel, 1 Inch x 18 Inches

***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Gloves (E186)

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P


ADAPTER ASSEMBLY
MATING SPLINES
20 X 26
D145-8031 SPA

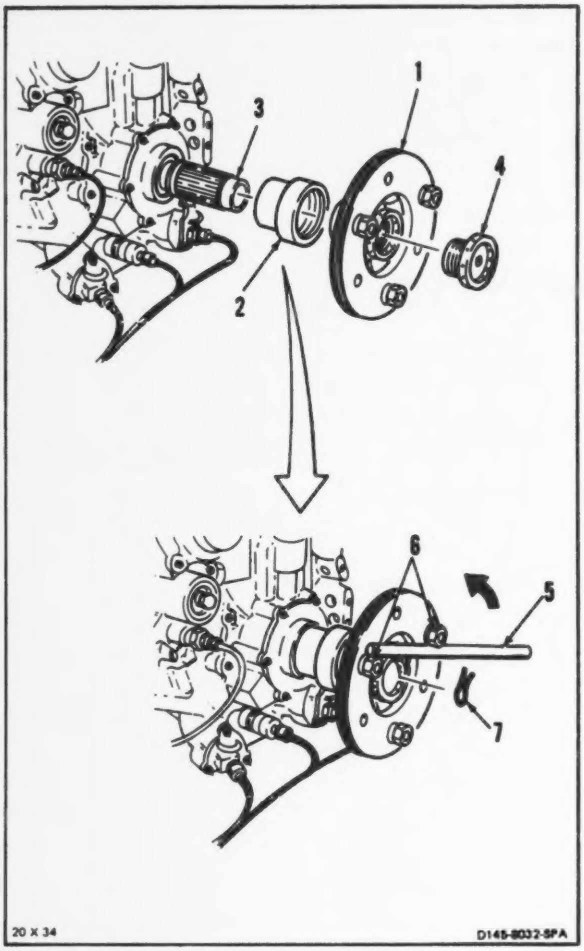
***GO TO NEXT PAGE***

## 6-9 INSTALL COMBINING TRANSMISSION FORWARD ADAPTER ASSEMBLY (Continued) 6-9

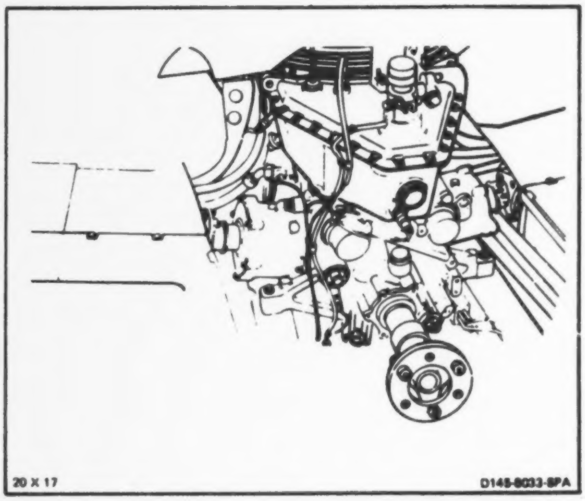
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.**

1. **Clean splines** of adapter assembly (1), retainer (2), and output shaft (3). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
2. If adapter assembly (1) is a replacement, **align drive shafting** (Task 6-20).
3. **Pack splines** of adapter assembly (1), retainer (2), and output shaft (3) **with grease (E162).**
4. **Install retainer (2) and adapter assembly (1)** on output shaft (3). Wipe off excess grease with cloths (E120).
5. Coat thread of retainer (4) with grease (E190). **Install retainer.**
6. Place wood dowel (5) across nuts (6) as shown. Hold dowel to keep adapter assembly (1) from turning. **Torque retainer to 825 inch-pounds.**
7. Continue tightening retainer (4) to **align holes** in retainer (4) and adapter assembly (1). **Install lockring (7).** Lockring shall protrude at least 0.06 inch through adapter assembly (1).



***INSPECT***



FOLLOW-ON MAINTENANCE:

Install No. 7 drive shaft (Task 6-19).

Phase rotary-wing blades (Task 6-28).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).

**END OF TASK**

## 6-10 INSPECT FORWARD DRIVE SHAFT

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Technical Inspection Tool Kit, NSN 5180-00-323-5114

Machinist's Scriber, NSN 5120-00-221-7063

***Materials:***

None

***Personnel Required:***

Inspector

***References:***

TM 43-0103

***Equipment Condition:***

Battery Disconnected (Task 1-39)

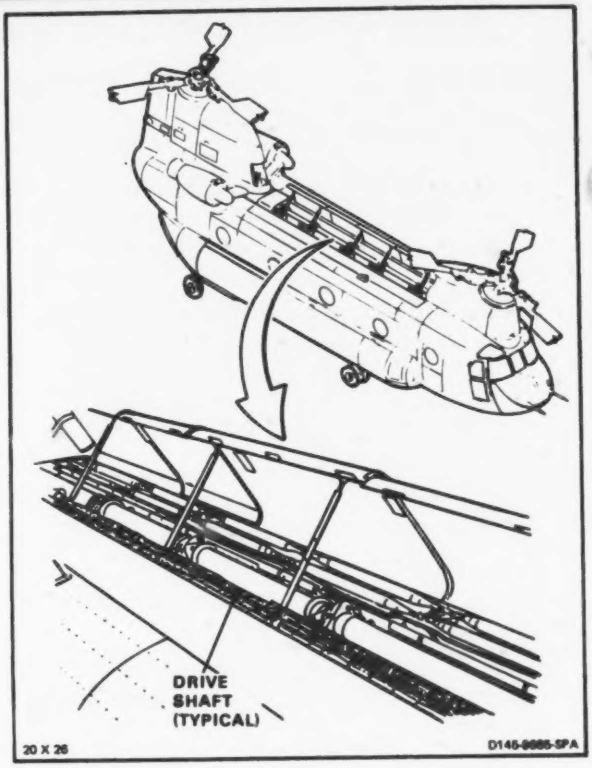
Electrical Power Off

Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)

***General Safety Instructions:***

**WARNING**

**Keep clear of turning rotor blades when rotating drive shaft. Turning blades can injure personnel.**



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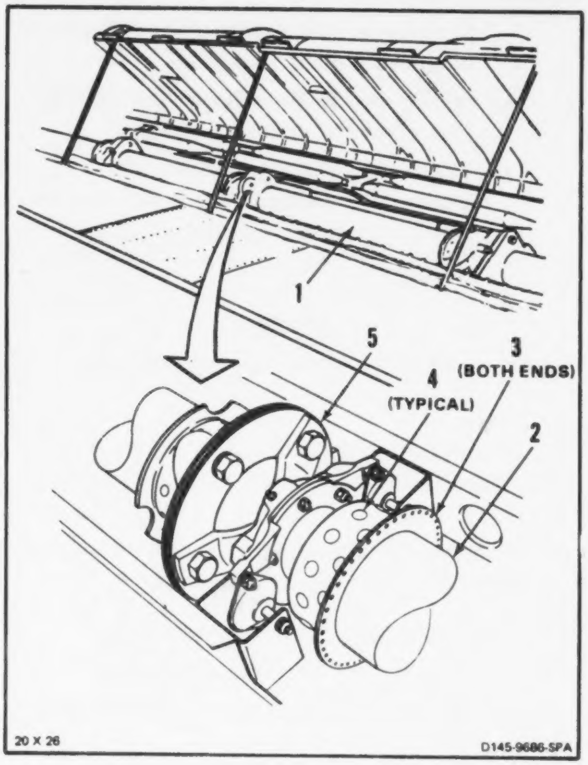
## 6-10 INSPECT FORWARD DRIVE SHAFT (Continued) 6-10



### NOTE

- Inspect all drive shafts in same way. Typical shaft shown.
- Rotate shaft as needed to do a complete check.
- Tube and adapter are balanced together. If one is damaged, both must be replaced.

1. **Inspect shaft (1) for damage** listed below. There shall be no such damage.
   a. **Cracks in tube (2).**
   b. **Dents in tube (2) more than 1-inch diameter or 0.040-inch deep.**
   c. **Distance between any two dents less than 4.50-inches.**
   d. **More than one dent around tube (2) at any one point.**
   e. **Distance between end flange (3) and any dent less than 1.25-inches.**
   f. **Loose or cracked rivets (4) at ends of tube.**

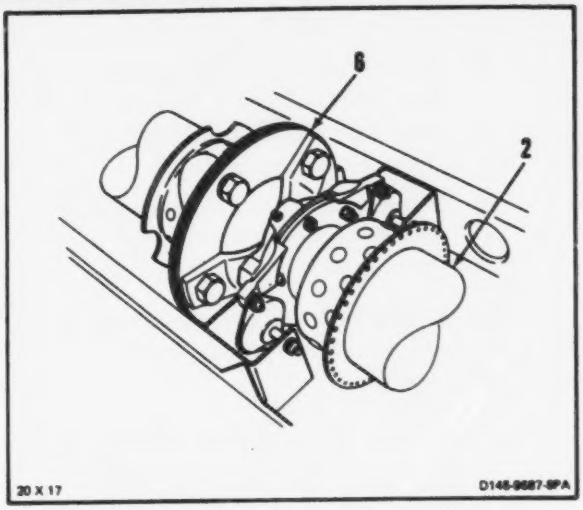
### NOTE

Adapters have a shotpeened surface. Damage cannot be repaired.

   g. **Cracks, nicks, scratches, or gouges in adapter (5).** Use a five-power magnifying glass to check.

*GO TO NEXT PAGE*

## 6-10 INSPECT FORWARD DRIVE SHAFT (Continued) 6-10



h. **Cracks in plates (6).** Use a five-power magnifying glass to check.

i. **Nicks on inside edge of plates (6).** Use a pointed scribe to check.

j. **Cracks, nicks, scratches, or gouges in dents in tube (2).** Use fluorescent inspection to check (TM 43-0103).

**NOTE**

Vibro-engraved factory markings on tube are allowed.

2. **Inspect** for nicks, scratches, or gouges in **tube (2) and plates (6).** Repair damage (Task 6-11).

3. Visually inspect tubes (2) for circumferential scoring. Observe following limits:

    a. Depth after blending: 0.009 inch.

    b. Length after blending: 2.0 inches.

    c. Minimum distance from adapter rivets: 7 inches, each end.

*GO TO NEXT PAGE*

## 6-10 INSPECT FORWARD DRIVE SHAFT (Continued) 6-10

4. Check for free movement of each shock mount (7) on spacer (8). Replace nicked, scored, or gouged spacers.
5. Check shock mounts (7) as follows:

**CAUTION**

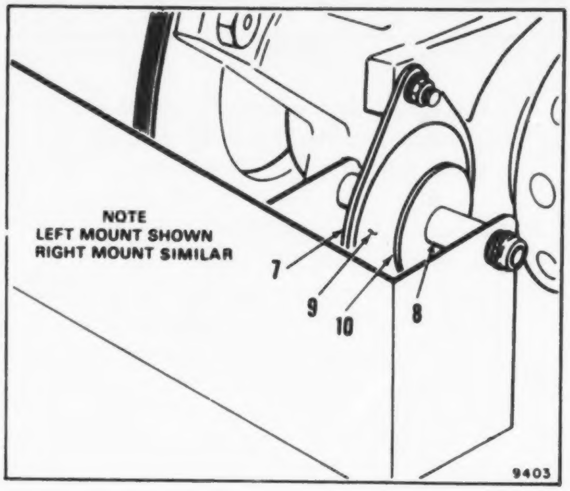
**Do not use screwdrivers to displace shaft. They may slip and damage elastomer.**

   a. Displace shaft in vicinity of mounts (7) laterally and vertically by hand pressure.
   b. While shaft assembly is displaced, inspect for tears in elastomer (9).
   c. Displace the shaft axially and radially by hand. Inspect for excessive play or binding between mount bushing (10) and spacer (8).
   d. Any tear in elastomer (9) over 1/4-inch long (including separation of elastomer from inner face of bushing (10)) is cause for rejection of mount. Tears usually occur at 6 o'clock position on mount (7).
   e. Excessive radial movement or irregularities interfering with free axial movement between bushing (10) and spacer (8) noted during the inspection process requires removal of mount (7) and spacer for detailed inspection and measurement as follows:

**NOTE**

Measurements shall be taken at 3 locations of equal distance along length of part.

      (1) Spacer — Replace if od is worn to less than 0.432 inch.
      (2) Mount — Replace if id of bushing (10) is more than 0.441 inch.

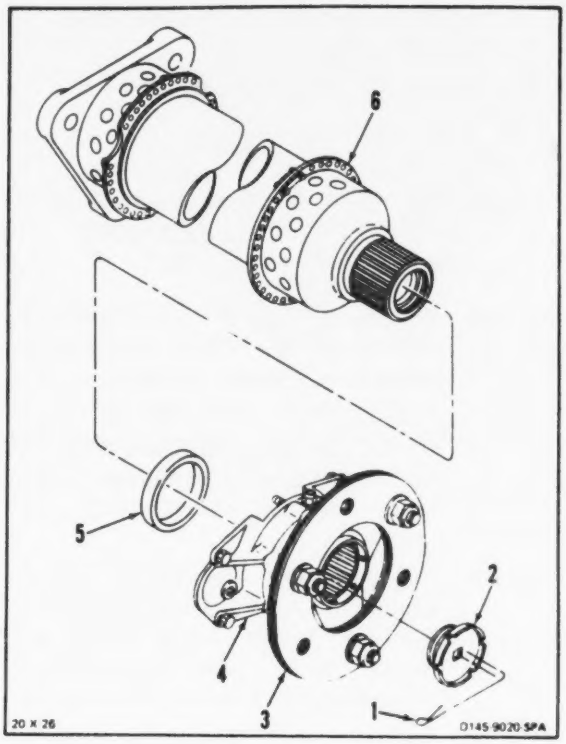


**END OF TASK**

**NOTE**

The following inspection procedure is required when the drive shaft retainer nut cotter pin (1) is missing.

1. Remove the affected shaft assembly from the aircraft. (Task 6-2, 6-3, or 6-4).
2. Check the torque on the retainer nut (2) in the tightening direction. If the torque is 1500 inch-pounds or greater, replace the cotter pin (1) and reinstall the drive shaft assembly (Task 6-17, 6-18, or 6-19).
3. If the retainer nut (2) torque is less than 1500 inch-pounds:
   a. Disassemble the drive shaft (Task 6-12).
   b. Inspect spacer (5) for wear. Replace the spacer if length is less than 0.60 inch.
   c. Inspect drive splines in the adapter assembly (3) and on the drive shaft (6) for wear. Replace the shaft assembly if the spline wear step exceeds 0.005 inch.



FOLLOW-ON MAINTENANCE:

Close forward drive shaft tunnel access covers (Task 2-2).

**END OF TASK**

## 6-11 REPAIR FORWARD DRIVE SHAFT 6-11

INITIAL SETUP

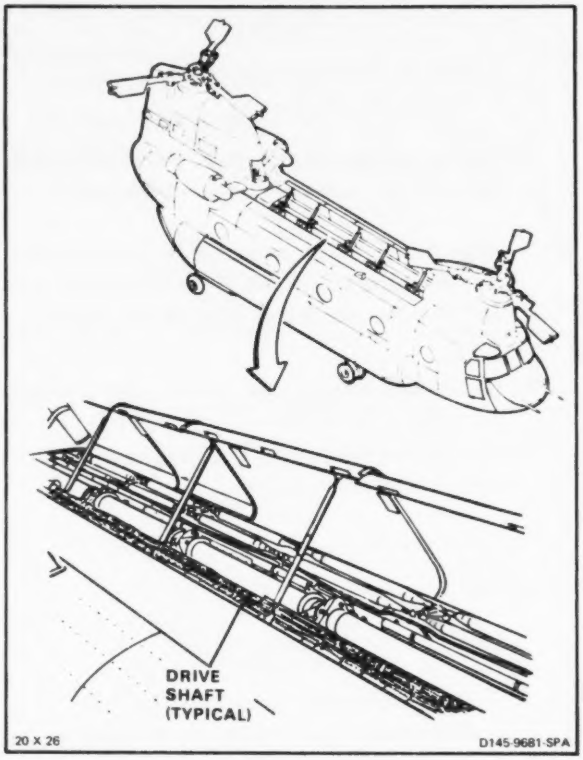
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Depth Gage 643J

***Materials:***
Crocus Cloth (E122)
Zinc Chromate Primer (E291)

***Personnel Required:***
67U20 Medium Helicopter Repairer
67U30 Inspector

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)



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## 6-11 REPAIR FORWARD DRIVE SHAFT (Continued) 6-11

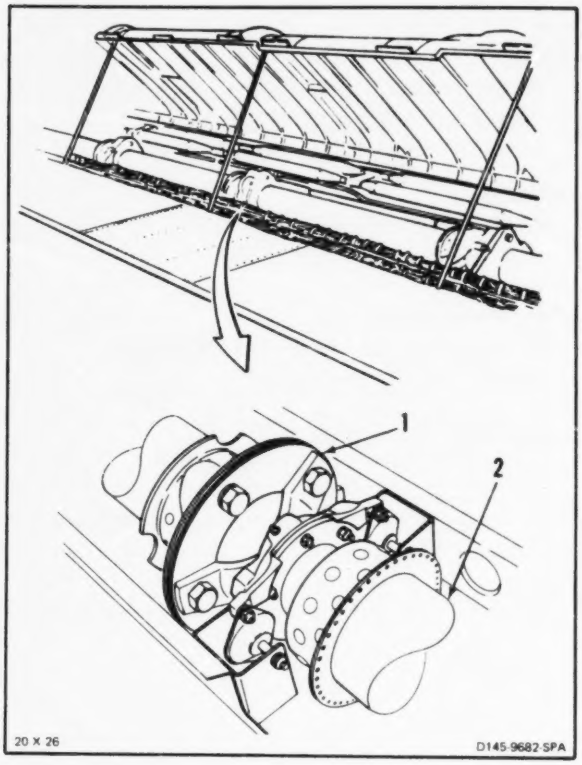
**NOTE**

Repair all drive shafts in same way. Typical shaft shown.

1. **Remove light scratches, corrosion and nicks from outside edge of plates (1).**

2. **Blend out nicks, scratches and gouges on the face of plates (1)** with crocus cloth (E122). **Do not go deeper than 0.001-inch.**

3. **Blend out scratches, nicks, and gouges** on tube (2) with crocus cloth (E122). **Do not go deeper than 0.010-inch.** Keep a blend radius of at least 1/2-inch.



*INSPECT*

**WARNING**

**Zinc chromate primer (E291) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

4. Touch up tube (2) as needed with zinc chromate primer (E291).

FOLLOW-ON MAINTENANCE:

Close forward drive shaft tunnel access doors (Task 2-2).

**END OF TASK**

## 6-13 INSPECT REMOVED DRIVE SHAFT MOUNT AND BUSHINGS 6-13

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Micrometer Caliper Set GGG-C-105
Telescoping Gage Set GGG-C-17, Type III, Class 2

***Materials:***
None

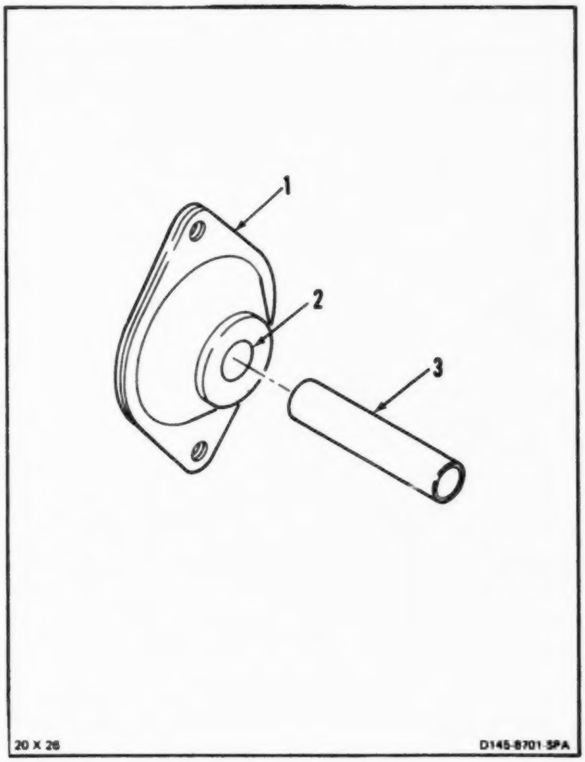
***Personnel Required:***
Medium Helicopter Repairer

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Off Helicopter Task

---

1. **Check mount (1)** for swollen or torn rubber and unbonding of rubber from metal. **There shall be no swelling or unbonding. There shall be no tears more than 0.25 inch long.**
2. **Measure diameter of bushing hole (2)** in mount (1). **Diameter shall not be more than 0.441 inch. Measure outside diameter of bushing (3). Diameter shall not be less than 0.432 inch.**



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-14 REMOVE FORWARD DRIVE SHAFT MOUNT 6-14

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Cloths (E120) or
Barrier Material (E80)

***Personnel Required:***
Medium Helicopter Repairer (2)

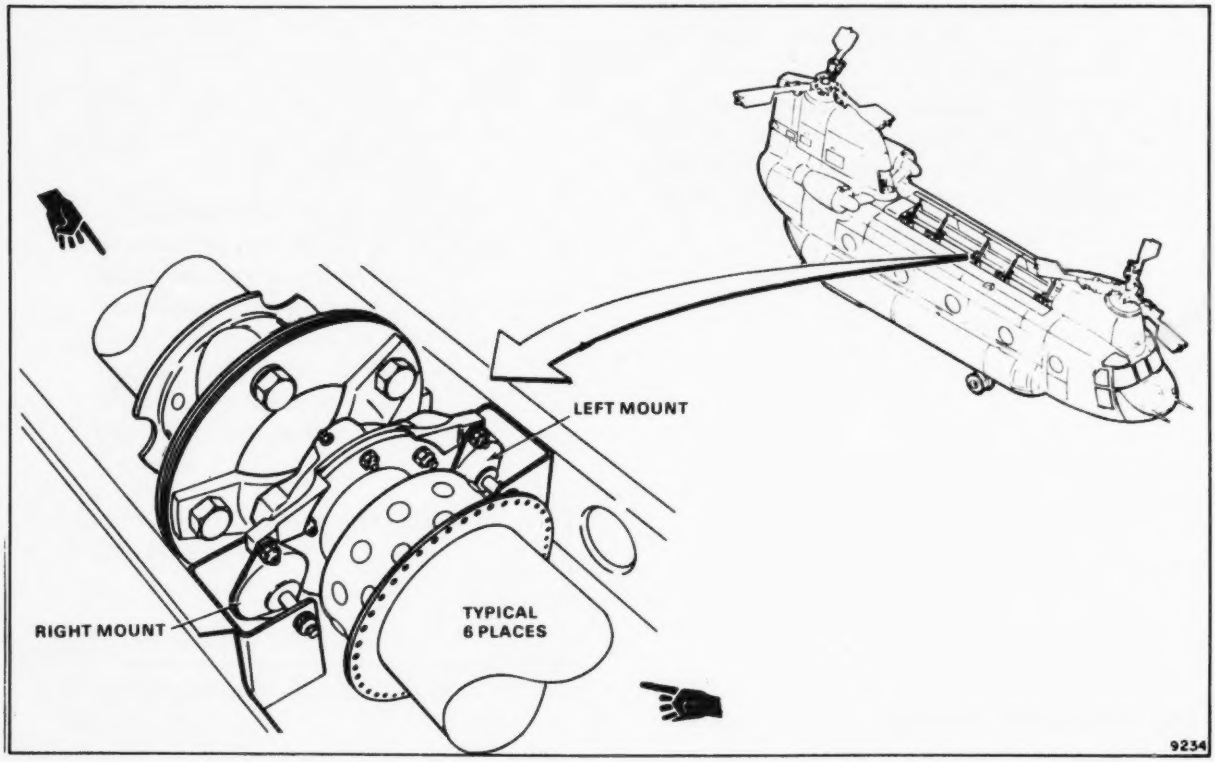
***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)
Forward Transmission Aft Fairing Removed (If Removing Forward Mounts) (Task 2-63)

***General Safety Instructions:***

**WARNING**

**Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.**



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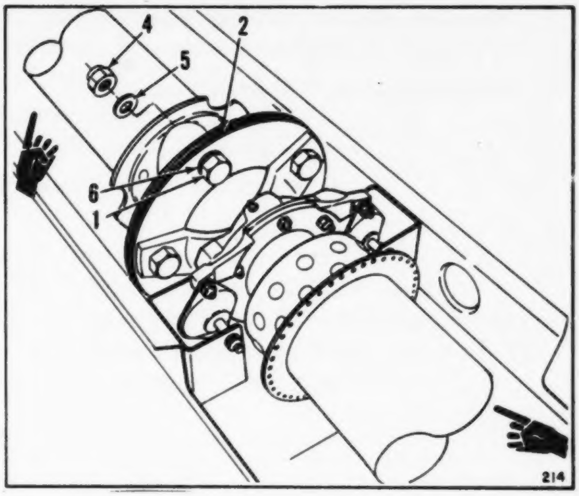
## 6-14 REMOVE FORWARD DRIVE SHAFT MOUNT (Continued) 6-14



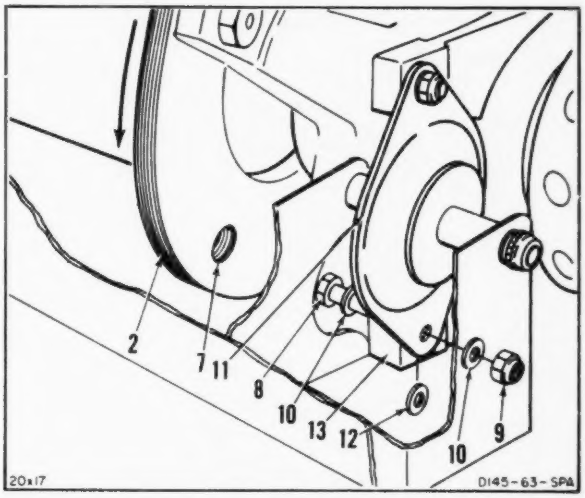
**CAUTION**

**Do not allow bolt to turn. If bolt turns, it can damage bolt and plates.**

**NOTE**

Remove left or right mount at any of six places in same way. Typical right mount is shown here.

1. Hold head of one bolt (1) in plates (2). Keep bolt from turning and remove nut (4) and special washer (5). **Remove bolt and washer (6).**

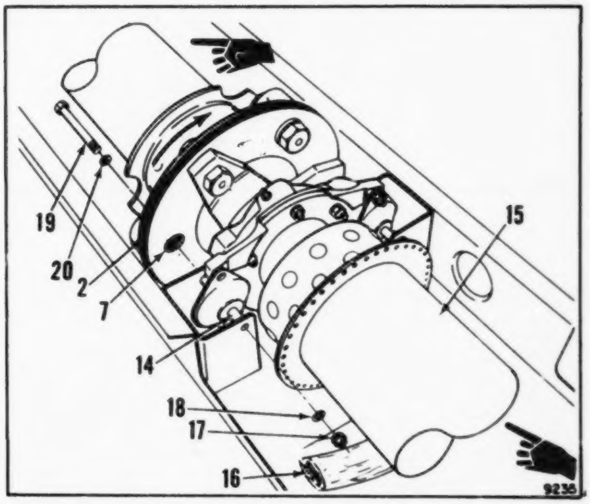


2. Rotate plates (2) to align hole (7) with lower of two mounting bolts (8).

**NOTE**

Reach lower bolt on drive shaft mount through bolt hole in plates. Use socket and extension.

3. **Remove two nuts (9), four washers (10), and two bolts (8)** from mount (11). **Remove thin washer (12)** from between mount and support (13).



4. Rotate plates (2) to align hole (7) with mount bushing (14).
5. Support shaft (15) with cloths (E120) or barrier material (E80) (16).

**NOTE**

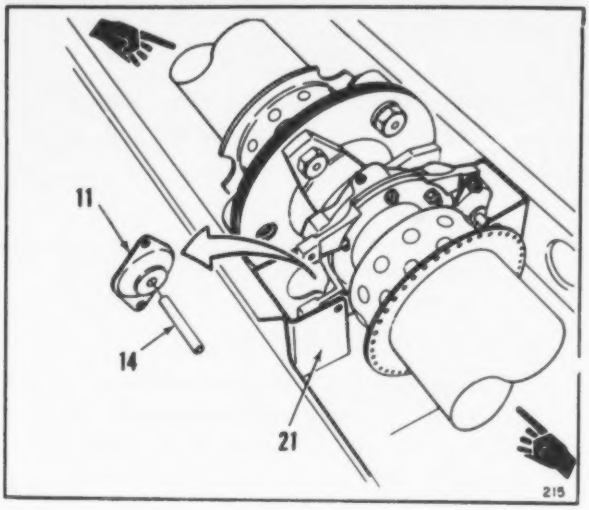
Reach center bolt on mount through bolt hole in plates. Use socket and extension.

6. Remove nut (17) and washer (18) from bushing bolt (19). **Remove bolt and washer (20).**

*GO TO NEXT PAGE*

## 6-14 REMOVE FORWARD DRIVE SHAFT MOUNT (Continued) 6-14

7. **Remove mount (11) and bushing (14)** from bracket (21).
8. Remove bushing (14) from mount (11).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-15 INSTALL FORWARD DRIVE SHAFT MOUNT 6-15

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 0 to 600 Foot-Pounds

***Materials:***

Oil (E254)

***Personnel Required:***

Medium Helicopter Repairer (2)
Inspector

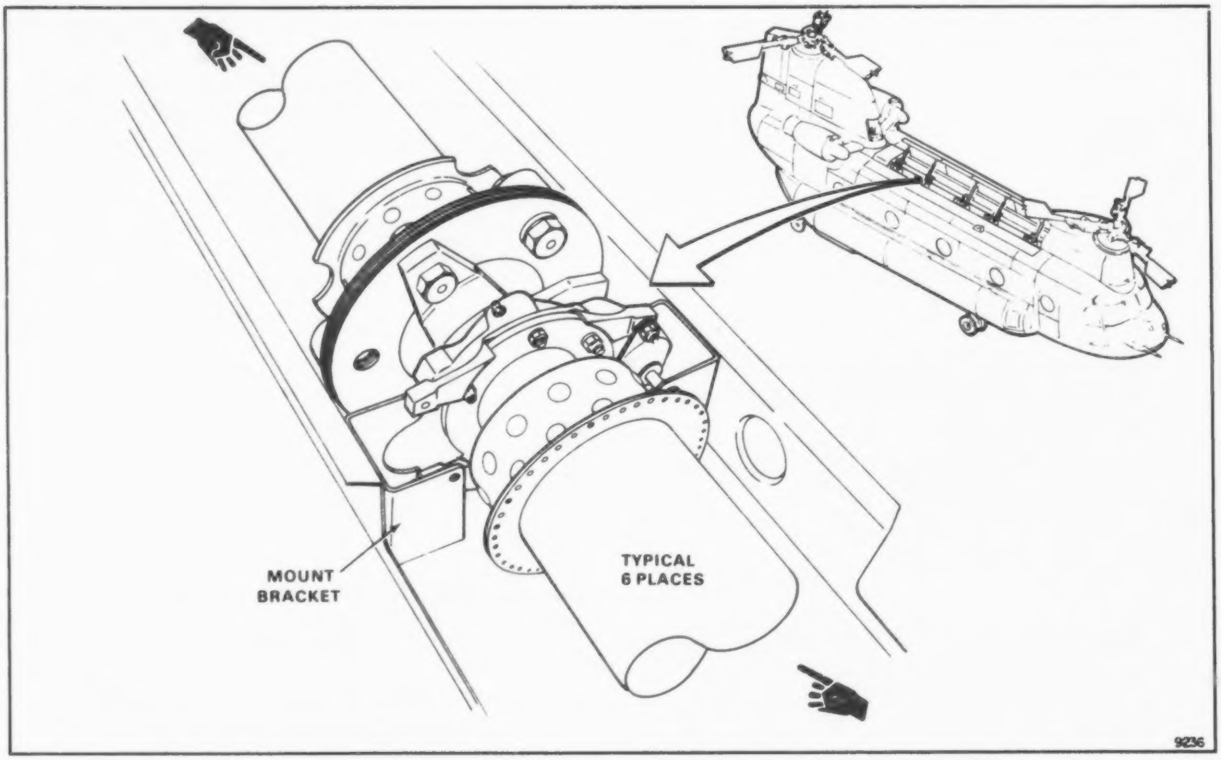
***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.**



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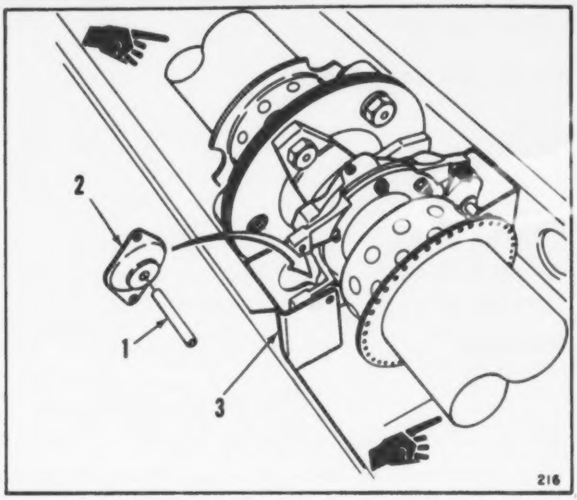
## 6-15 INSTALL FORWARD DRIVE SHAFT MOUNT (Continued) 6-15



**NOTE**

Install left or right mount at any of six places in same way. Typical right mount is shown here.

1. Install bushing (1) in mount (2).

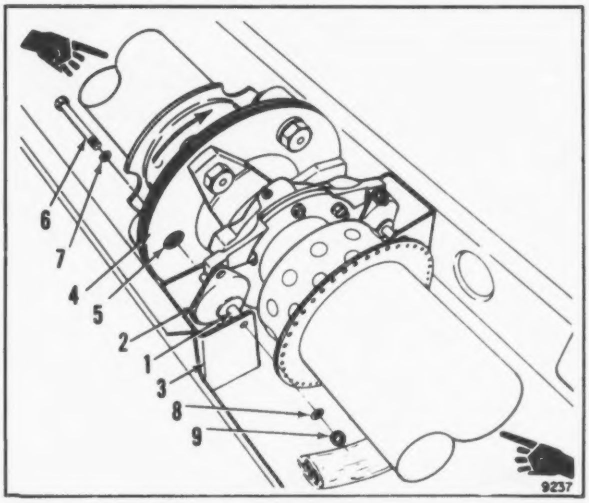
**NOTE**

There are two types of mount and bushing assemblies used. Helicopters with 1 and those modified by attrition have improved mount and bushing assemblies. Be sure to install matching part number mounts and bushings on both sides of shaft.

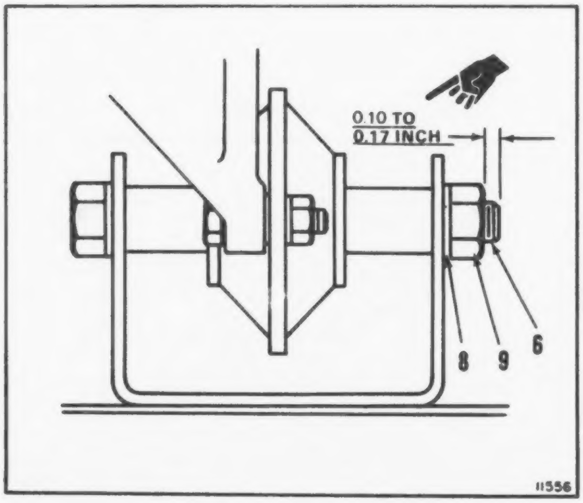
2. **Position mount (2)** with bushing (1), into bracket (3).
3. Rotate plates (4) to align bolt hole (5) with bushing (1).

**NOTE**

Reach center bolt hole in mount through bolt holes in plate. Use socket and extension.



4. **Coat thread of bolt (6) with oil (E254). Install bolt** and washer (7) through bracket (3) and bushing (1).
5. Install washer (8) and nut (9). **Torque nut to 155 inch-pounds.**



6. **Check bolt (6).** There shall be 0.10 to 0.17 inch of bolt extending through nut (9). Install another washer (8) or thinner washer, if needed.

*GO TO NEXT PAGE*

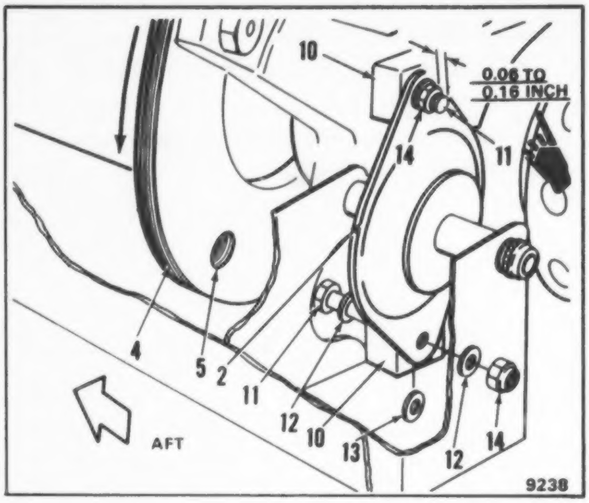
## 6-15 INSTALL FORWARD DRIVE SHAFT MOUNT (Continued) 6-15

7. Rotate plates (4) to align hole (5) with lower of two mounting bolt holes in support (10).

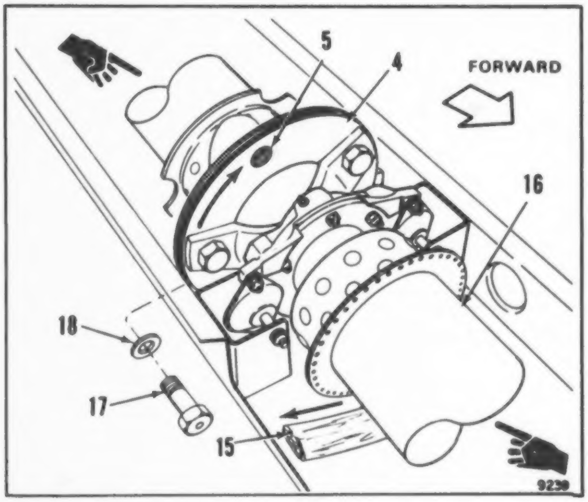
**NOTE**

Reach lower bolt holes in mount through bolt hole in plates. Use socket and extension.

8. Install two bolts (11), four washers (12), two thin washers (13), and two nuts (14) through mount (2) and upper and lower supports (10). Install bolts with head aft. Install thin washer between support and mount. **Torque bolts to 35 inch-pounds.**
9. Check bolts (11). There shall be 0.06 to 0.16 inch of bolt extending through nut (14). Install another washer (12) or a thinner washer if needed.



10. **Remove cloth or barrier material (15)** from under shaft (16).
11. **Rotate plates (4)** to position hole (5) on top.
12. Coat thread of bolt (17) with oil (E254). **Install bolt** (head forward) and special washer (18) through plates (4).

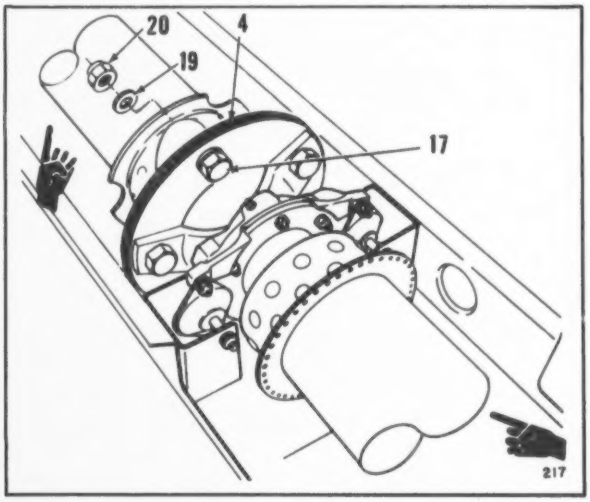


13. **Install washer (19) and nut (20).**

**CAUTION**

**Do not allow bolt to turn. If bolt turns, it can damage bolt and plates.**

14. Hold head of bolt (17) with wrench. **Check nut (20) for friction torque** of at least 70 inch-pounds. If nut does not meet torque, replace it.
15. **Torque nut (20)** to 1050 inch-pounds.



***INSPECT***

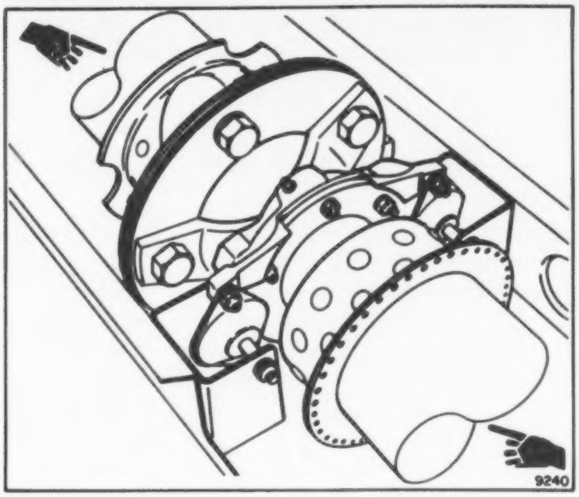
***GO TO NEXT PAGE***

## 6-15 INSTALL FORWARD DRIVE SHAFT MOUNT (Continued) 6-15

FOLLOW-ON MAINTENANCE:

Close forward drive shaft tunnel access doors (Task 2-2).

Install forward transmission fairing (if removed) (Task 2-67).



**END OF TASK**

## 6-16 ASSEMBLE DRIVE SHAFT 6-16

INITIAL SETUP

***Applicable Configurations:***
All

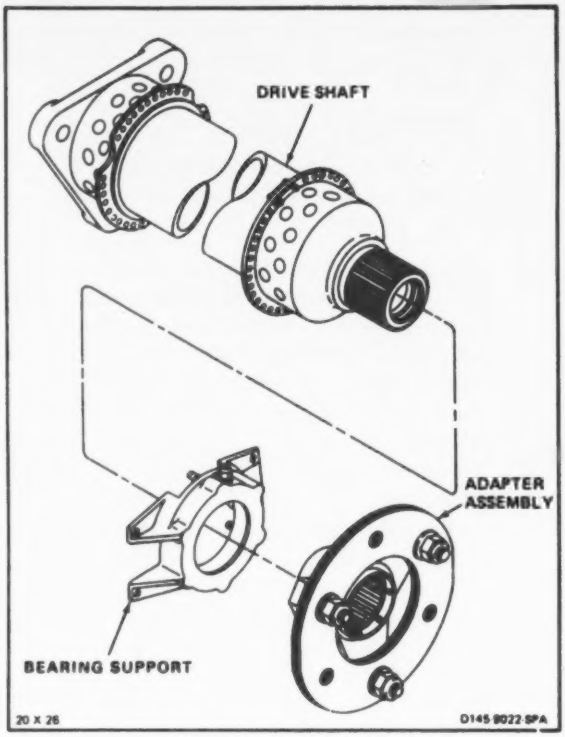
***Tools:***
Powertrain Tool Kit,
NSN 5280-00-323-5267
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds
Aluminum Tube, 3-Inch id, 1/8-Inch Thick Wall,
1 to 6 Inches Long
Arbor Press

***Materials:***
Grease (E190)
Antiseize Compound (E75)
Cloths (E120)

***Parts:***
Cotter Pin

***Personnel Required:***
68D20 Aircraft Powertrain Repairer
67U30 Inspector

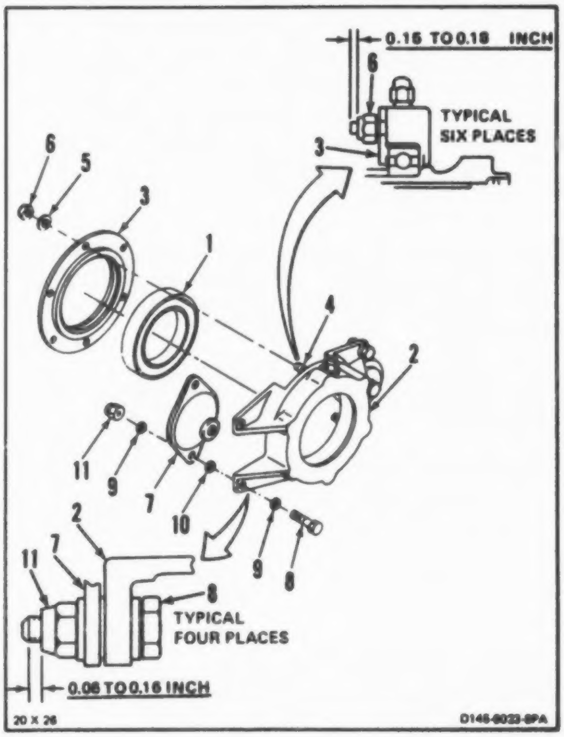
***References:***
TM 55-1520-240-23P


DRIVE SHAFT
ADAPTER ASSEMBLY
BEARING SUPPORT
20 X 26
D145 9022 SPA

**NOTE**

Assembly procedure is for No. 1 thru No. 6 drive shaft. Typical shaft shown here.

1. Pack bearing (1) with grease (E190).
2. **Install bearing (1)** in bearing support (2). Use aluminum tube as a tool. Make sure bearing seats firmly in support.
3. **Install bearing retainer (3)** on six studs (4) of bearing support (2). Smooth side of retainer shall face out.
4. Install six washers (5) and nuts (6). **Torque nuts to 60 inch-pounds.** Check studs (4). There shall be 0.15 to 0.18 inch of stud extending through nut.
5. **Position mount (7)** on each side of support (2). Install bolt (8), two washers (9), thin washer (10) and nut (11) two places on each mount. **Torque nuts to 25 inch-pounds.**
6. Check bolts (8). There shall be 0.06 to 0.16 inch of bolt extending through each nut (11).


0.15 TO 0.18 INCH
6
TYPICAL SIX PLACES
3
6
5
3
1
4
2
11
9
7
10
2
7
11
9
8
8
TYPICAL FOUR PLACES
0.06 TO 0.16 INCH
20 X 26
D145 9023 SPA

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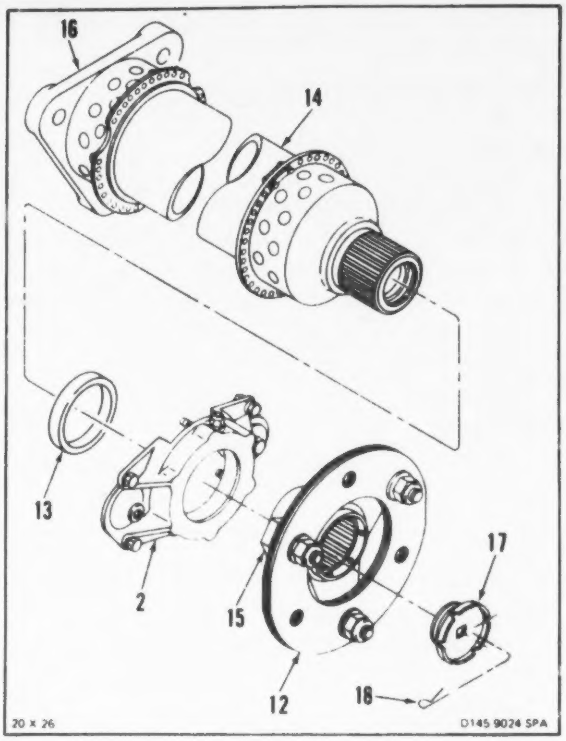
## 6-16 ASSEMBLE DRIVE SHAFT (Continued) 6-16



7. **Install bearing support (2) on adapter assembly (12).** Use arbor press and aluminum tube. Install spacer (13) on adapter assembly.

**NOTE**

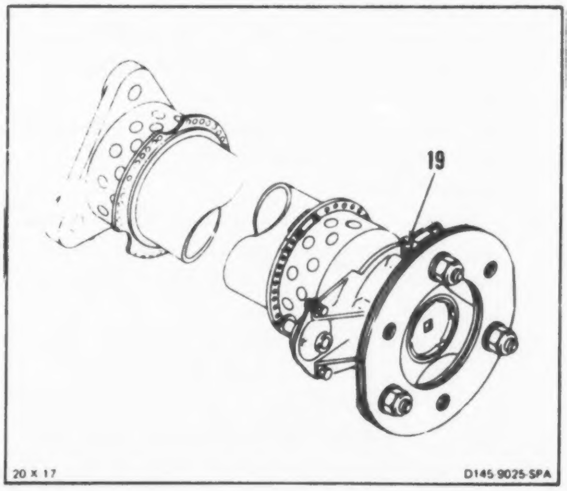
If adapter assembly and shaft do not have same serial number, they must be balanced.

8. **Check** that adapter assembly (12) and shaft (14) have the same **stencilled serial number.** If stencilled numbers are not readable, check that vibro-engraved serial numbers on adapter assembly and drive shaft match numbers recorded in DA Forms 2410 or 2408-16.
9. **Clean splines** of adapter assembly (12) and shaft (14).
10. Apply light coat of grease (E190) to splines of adapter assembly (12) and shaft (14). Wipe off excess with cloths (E120).
11. **Align leg (15)** marked 1 on adapter assembly (12) **with leg (16)** marked 2 of shaft (14). Install adapter assembly on splines of shaft.

12. Check retainer nut (17) for presence of two nylon selflocking inserts. Coat threads of nut with antiseize compound (E75). **Install nut** in shaft (14) and check for a minimum run-on torque of 60 inch-pounds. **Torque nut to 1500 INCH-POUNDS.**

13. Continue to tighten nut (17) until slot in nut lines up with hole in adapter assembly (12). **Install cotter pin (18),** with head on inside of nut.

14. Add grease (E190) at fitting (19).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-17 INSTALL NO. 1 DRIVE SHAFT 6-17

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Torque Wrench, 100 to 150 Inch-Pounds

Torque Wrench, 700 to 1600 Inch-Pounds

***Materials:***

Oil (E254)

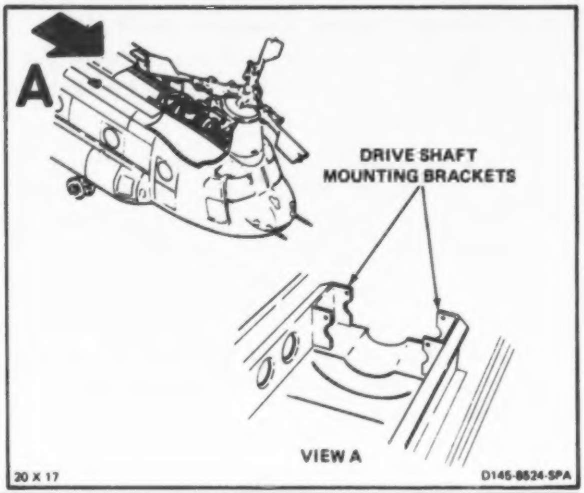
***Personnel Required:***

Medium Helicopter Repairer (2)

Inspector

***References:***

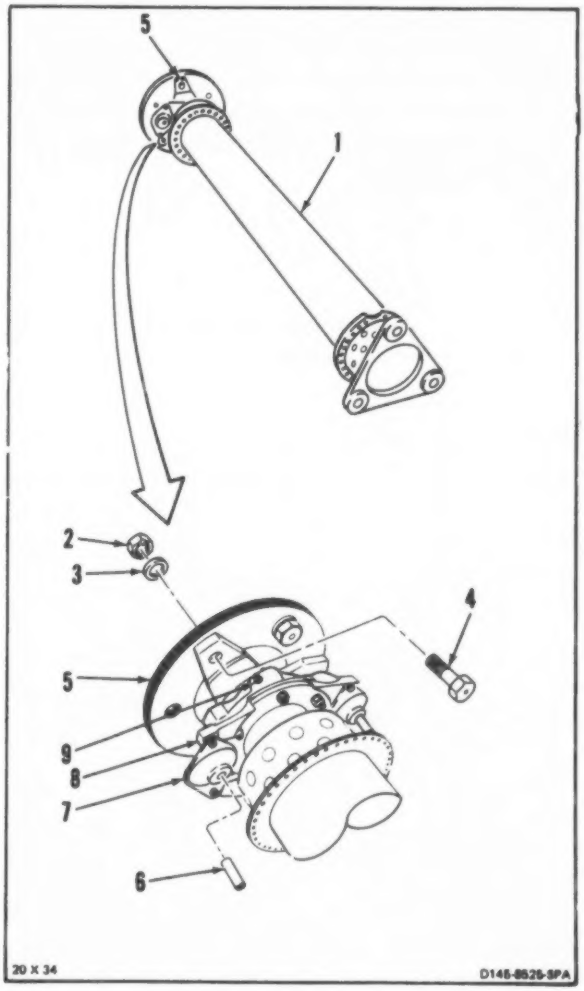
TM 55-1520-240-23P


A
DRIVE SHAFT MOUNTING BRACKETS
VIEW A
20 X 17
D145-8524-SPA

**CAUTION**

**Do not allow bolt to turn. If bolt turns, bolt and plates can be damaged.**

1. If a replacement shaft (1) is being installed, remove one nut (2), washer (3), and bolt (4) from adapter assembly (5). During removal, hold head of bolt with wrench. Install bushing (6) on mount (7) at each side of adapter assembly.
2. **Turn bearing support housing (8) so that grease fitting (9) faces up.**


5
1
2
3
4
5
9
8
7
6
20 X 34
D145-8525-SPA

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## 6-17 INSTALL NO. 1 DRIVE SHAFT (Continued) 6-17

3. With aid of helper, **position shaft (1)** in structure (10) against forward transmission adapter (11). **Install two mount bushings (6) in brackets (12).**
4. Coat thread of three bolts (13) with oil (E254). **Install bolts, head forward, special washers (14), washers (15), and nuts (16)** at forward end of shaft (1).

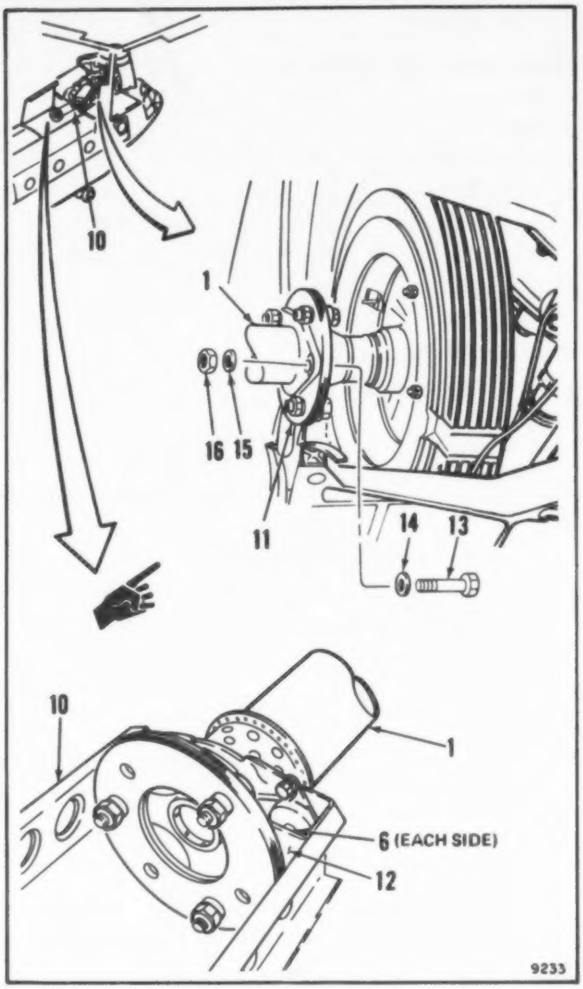
**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.**

**NOTE**

If nuts do not meet friction torque, they must be replaced.

5. Hold head of bolts (13) with wrench. **Check nuts (16) for friction torque at least 70 inch-pounds. Torque nuts to 1050 inch-pounds.**



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## 6-17 INSTALL NO. 1 DRIVE SHAFT (Continued) 6-17

**CAUTION**

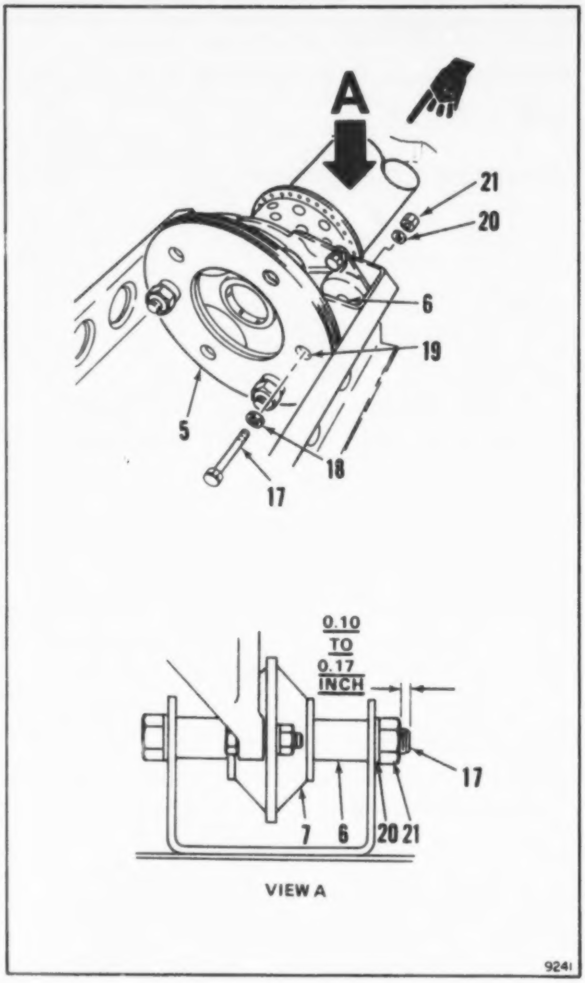
**Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.**

**NOTE**

Install bolt in mount at each side of shaft in same way. Right mount shown here.

6. Rotate shaft to align one of the bolt holes in adapter assembly (5) with mount bushing (6).
7. Coat thread of bolt (17) with oil (E254). **Install bolt and washer (18)** through bolt hole (19) into bushing (6). Use socket and extension.
8. **Install washer (20) and nut (21). Torque nut to 155 inch-pounds.**
9. **Check bolt (17).** There shall be 0.10 to 0.17 inch of bolt extending through nut (21). Install another washer (20) or a thinner washer if needed.
10. **Check mount (7) for freedom of motion** on bushing (6). There shall be no binding.
11. Deleted.

***INSPECT***



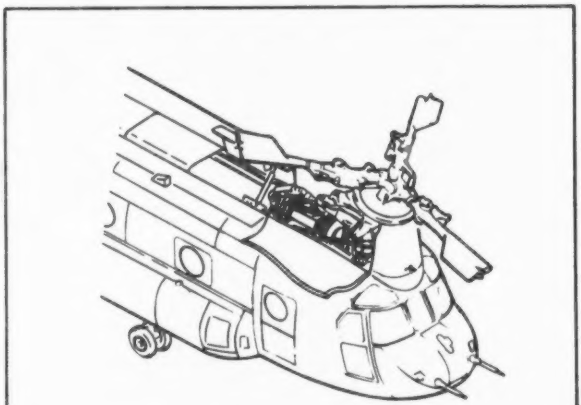
FOLLOW-ON MAINTENANCE:

Install No. 2 drive shaft (Task 6-18).

Check rotary-wing blade phasing (Task 6-28).

Install forward transmission aft fairing (Task 2-68).

Close forward drive shaft tunnel access cover (Task 2-2).



**END OF TASK**

## 6-18 INSTALL NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT 6-18

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds

***Materials:***
Oil (E254)

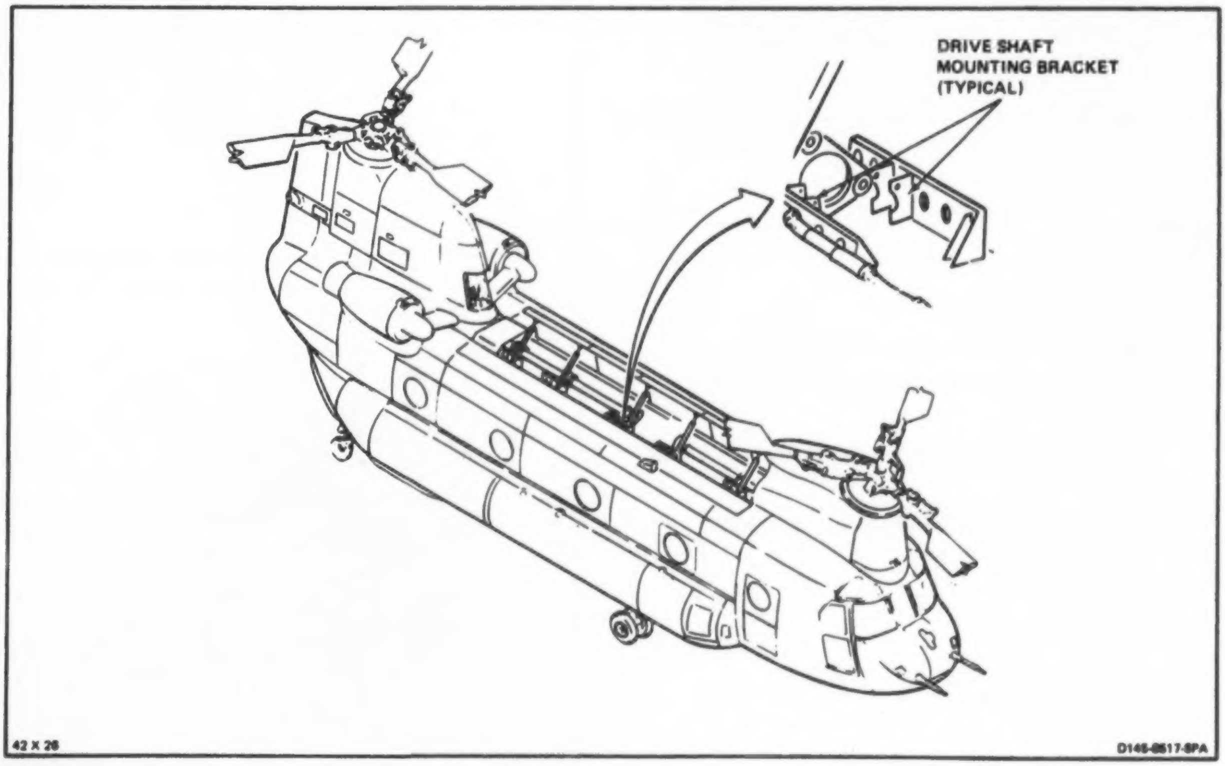
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.**



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## 6-18 INSTALL NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-18

**NOTE**

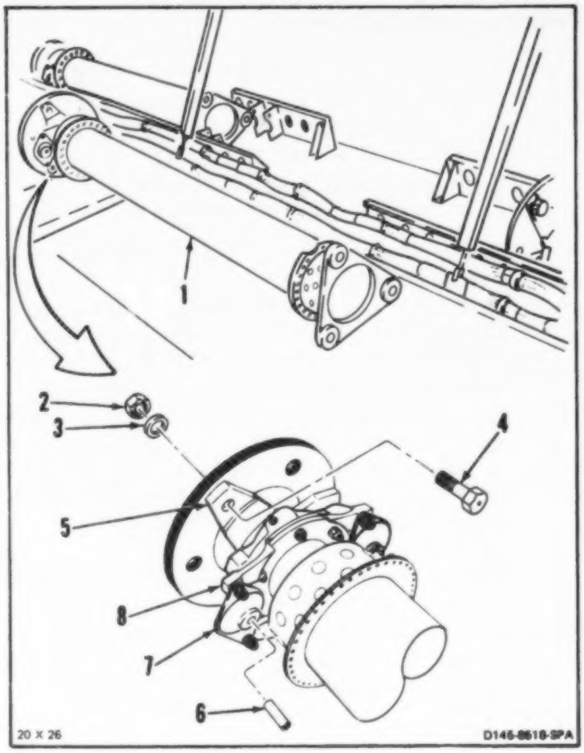
Install shaft No. 2 thru No. 6 in same way. Typical shaft shown here.

***INSTALL SHAFT***

**CAUTION**

**Do not allow bolt to turn. If bolt turns, bolt and plates can be damaged.**

1. If a replacement shaft (1) is being installed, remove one nut (2), washer (3), and bolt (4) from adapter assembly (5). During removal, hold head of bolt with wrench. Install bushing (6) on mount (7) at each side of support housing (8).

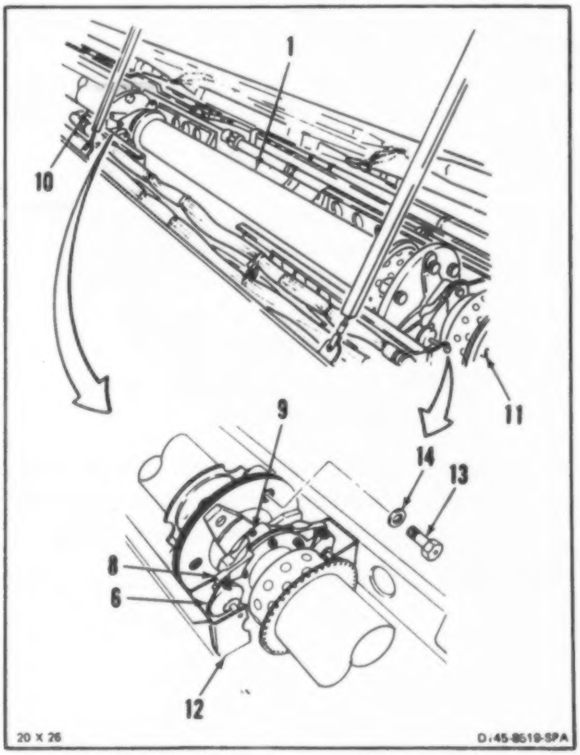


2. **Turn bearing support housing (8) so that grease fitting (9) faces up.**

**NOTE**

Do not disturb alignment of installed shafts. This keeps forward and aft rotor blades in phase.

3. With aid of helper, **position shaft (1)** between installed shafts (10 and 11), with two mount bushings (6) in brackets (12).
4. Coat thread of six bolts (13) with oil (E254). **Install three bolts, head forward, and special washers (14) at each end of shaft (1).**



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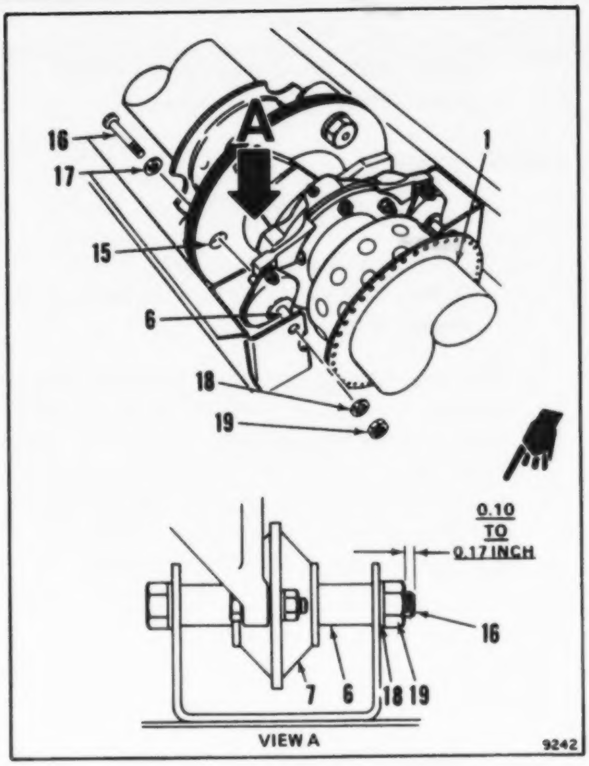
## 6-18 INSTALL NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-18

### *INSTALL MOUNT BOLTS*

**NOTE**

- Install bolt in mount at each side of shaft in same way. Right mount shown here.
- All shafts must be rotated as a unit to keep rotor blades in phase.

5. Rotate shaft (1) to align bolt hole (15) with mount bushing (6).
6. Coat thread of bolt (16) with oil (E254). **Install bolt and washer (17)** through bolt hole (15) into bushing (6). Use socket and extension.
7. **Install washer (18) and (19). Torque nut to 155 inch-pounds.**
8. **Check bolt (16).** There shall be 0.10 to 0.17 inch of bolt extending through nut (19). Install another washer (18) or a thinner washer if needed.
9. **Check mount (7) for freedom of motion** on bushing (6). There shall be no binding.
10. If all forward shafting is now installed, **check that mount (7) between shafts 3 and 4 is centered on bushing (6)** within 0.06 inch. If it is not, align shafting (Task 6-20).



### *INSTALL END BOLTS*

11. **Install washers (20) and nuts (21)** on three bolts (13) at **each end of shaft (1).**

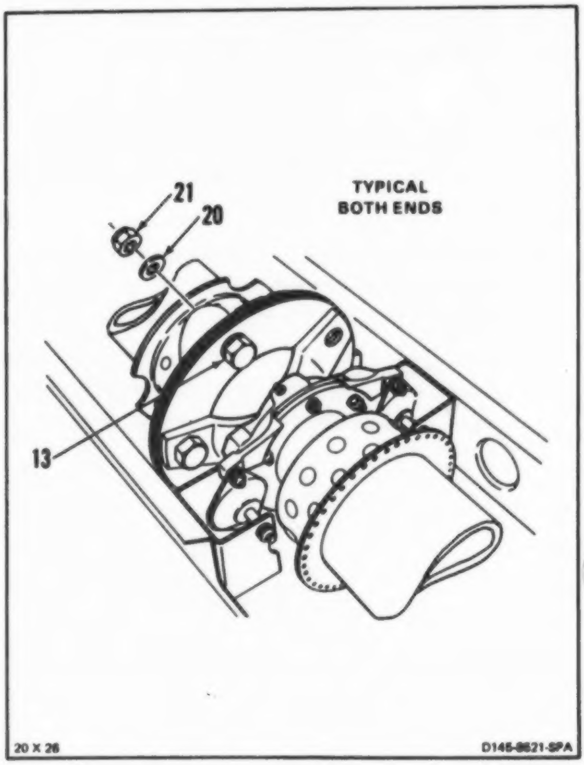
**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.**

**NOTE**

If nuts do not meet friction torque, they must be replaced.

12. Hold head of bolts (13) with wrench. **Check nuts for friction torque of at least 70 inch-pounds. Torque nuts to 1050 inch-pounds.**



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## 6-18 INSTALL NO. 2 THRU NO. 6 FORWARD DRIVE SHAFT (Continued) 6-18

13. Coat two adapter assembly bolts (4) with oil (E254). **Install bolts special washers (3), and nuts (2).**

**CAUTION**

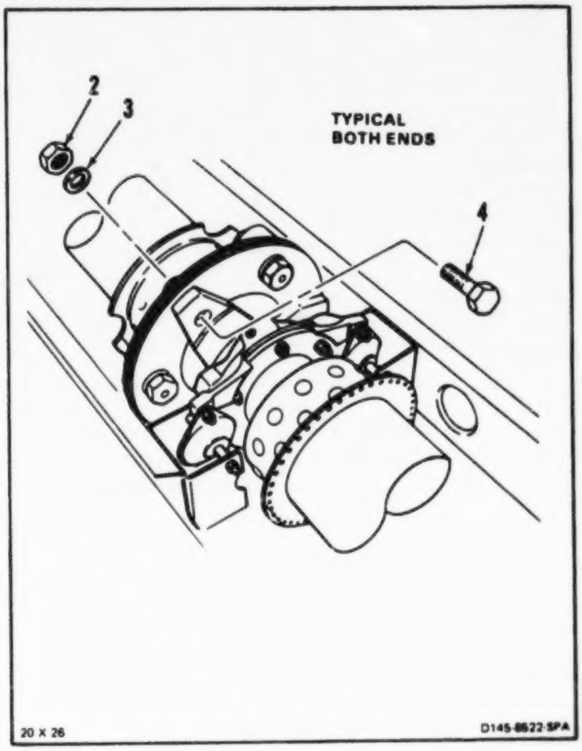
**Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.**

**NOTE**

If nuts do not meet friction torque, they must be replaced.

14. Hold head of bolts (4) with wrench. **Check nuts for friction torque of at least 70 inch-pounds. Torque nuts to 1050 inch-pounds.**

***INSPECT***

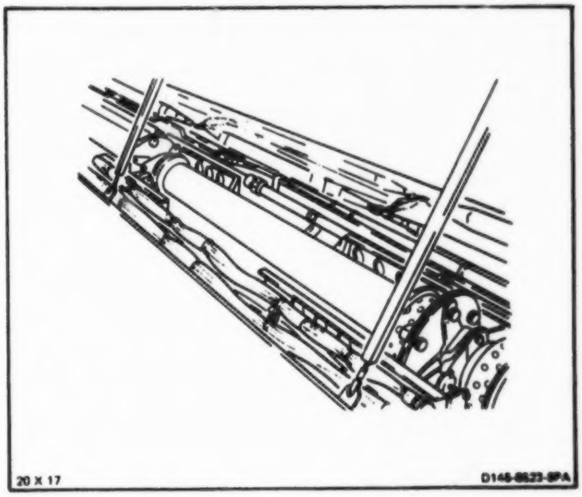


FOLLOW-ON MAINTENANCE:

Check rotary-wing blade phasing (Task 6-28).

Close forward drive shaft tunnel access covers (Task 2-2).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-19 INSTALL NO. 7 DRIVE SHAFT

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Oil (E254)

***Personnel Required:***
Medium Helicopter Repairer (2)
Inspector

***References:***
TM 55-1520-240-23P

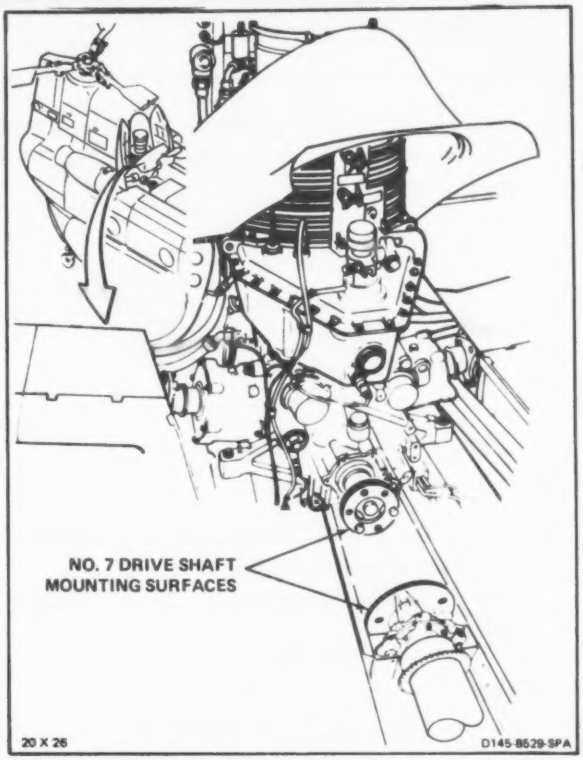
***General Safety Instructions:***

**WARNING**

**Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

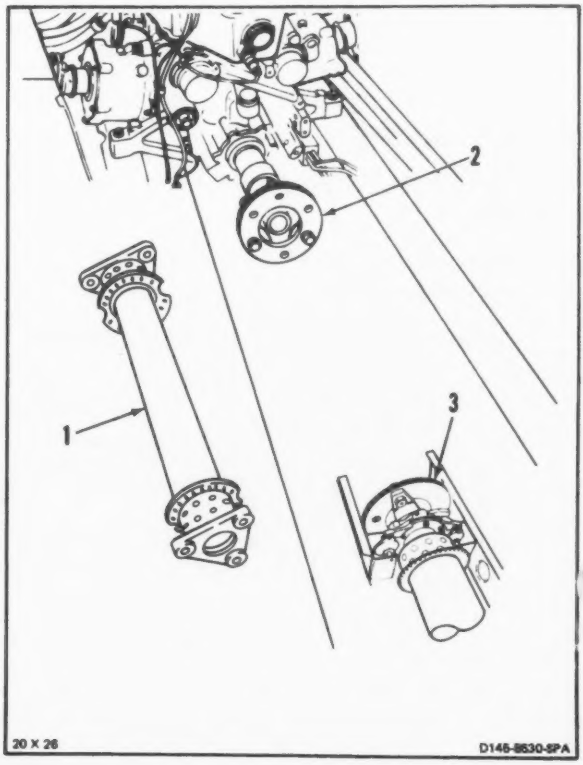
**Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**



**NOTE**

Do not disturb alignment of installed adapter assembly and shaft. This keeps forward and aft rotor blades in phase.

1. With aid of helper, **position shaft (1)** between combining transmission adapter assembly (2) and No. 6 drive shaft (3).



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## 6-19 INSTALL NO. 7 DRIVE SHAFT (Continued) 6-19

**NOTE**

Special washers are installed against adapter assemblies.

2. Coat thread of six bolts (4) with oil (E254). **Install three bolts, head forward, special washers (5), washers (6), and nuts (7) at each end of shaft (1).**

**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.**

**NOTE**

If nuts do not meet friction torque, they must be replaced.

3. Hold head of bolts (4) with wrench. **Check nuts for friction torque of at least 70 inch-pounds. Torque nuts to 1050 inch-pounds.** Coat two adapter assembly bolts (8) with oil (E254). **Install bolts, special washers (9), and nuts (10).**

**CAUTION**

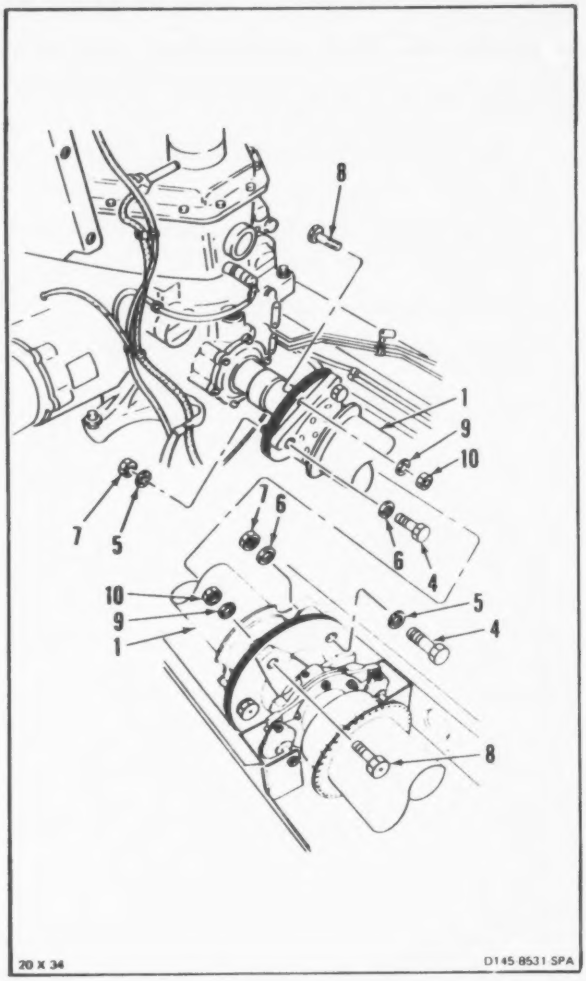
**Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.**

**NOTE**

If nuts do not meet friction torque, they must be replaced.

4. Hold head of bolts (8) with wrench. **Check nuts for friction torque of at least 70 inch-pounds. Torque nuts to 1050 inch-pounds.**

***INSPECT***



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## 6-19 INSTALL NO. 7 DRIVE SHAFT (Continued) 6-19

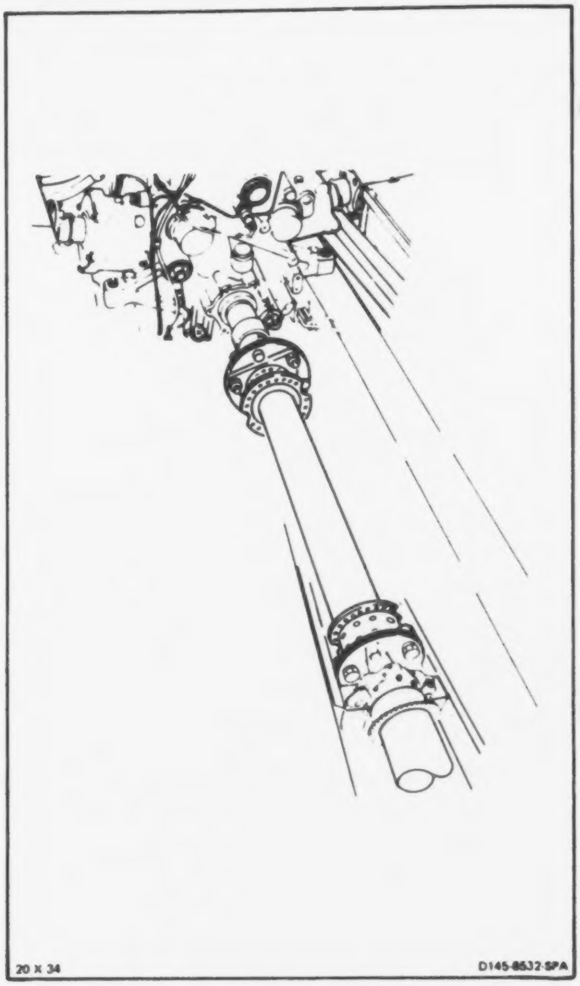
FOLLOW-ON MAINTENANCE:

Check rotary-wing blade phasing (Task 6-28).

Close forward drive shaft tunnel No. 6 drive shaft cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).



**END OF TASK**

## 6-20 ALIGN FORWARD DRIVE SHAFTING 6-20

INITIAL SETUP

***Applicable Configurations:***
All

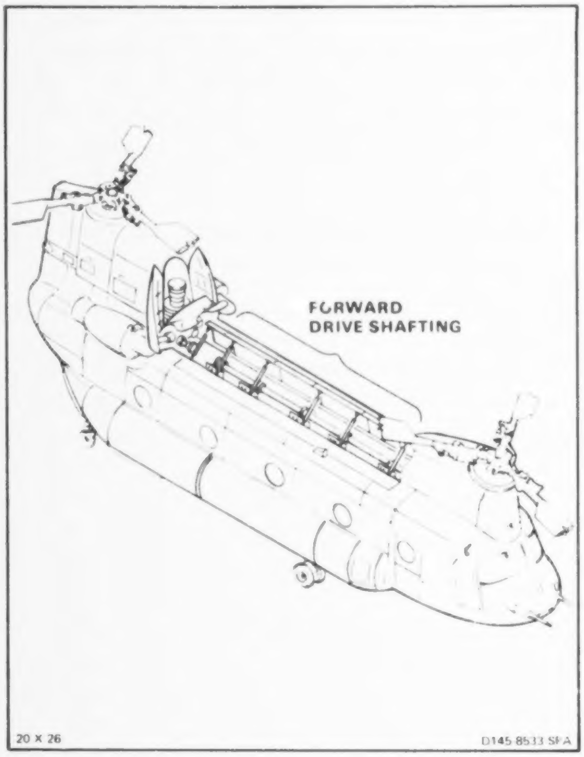
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds

***Materials:***
None

***Personnel Required:***
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P
Task 6-9
Task 6-19

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Raised (Task 2-2)
No. 7 Drive Shaft Removed (Task 6-4)
Combining Transmission Forward Adapter Assembly Removed (Task 6-6)
Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)



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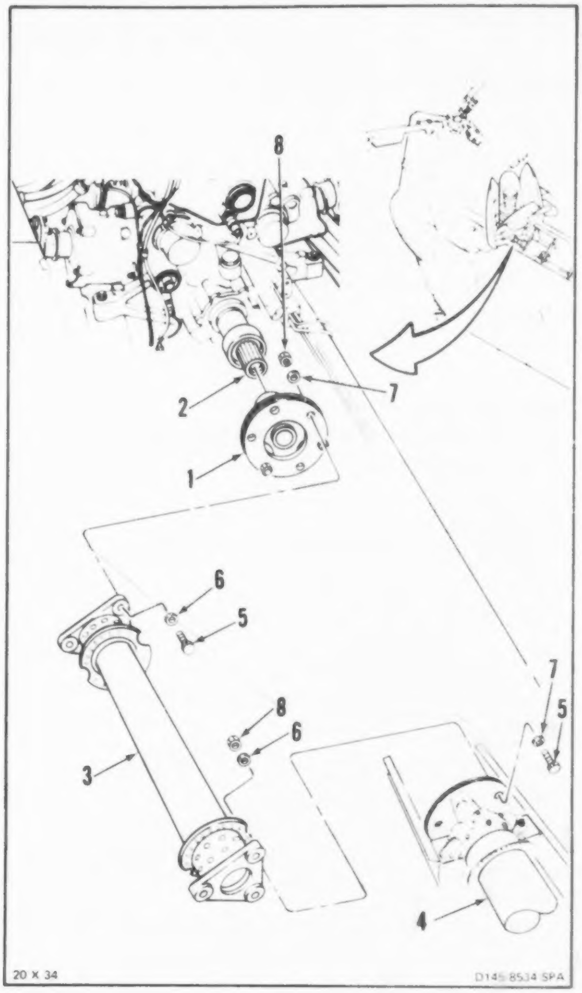
## 6-20 ALIGN FORWARD DRIVE SHAFTING (Continued) 6-20

**NOTE**

Do not change position of combining transmission output shaft or No. 6 drive shaft. If positions are changed, rotary-wing blades will be put out of phase.

1. **Install adapter assembly (1)** on combining transmission forward output shaft (2).
2. **Position No. 7 drive shaft (3)** between No. 6 drive shaft (4) and adapter assembly (1). **Temporarily install shaft** with one bolt (5), washer (6), special washer (7) and nut (8) at each end.



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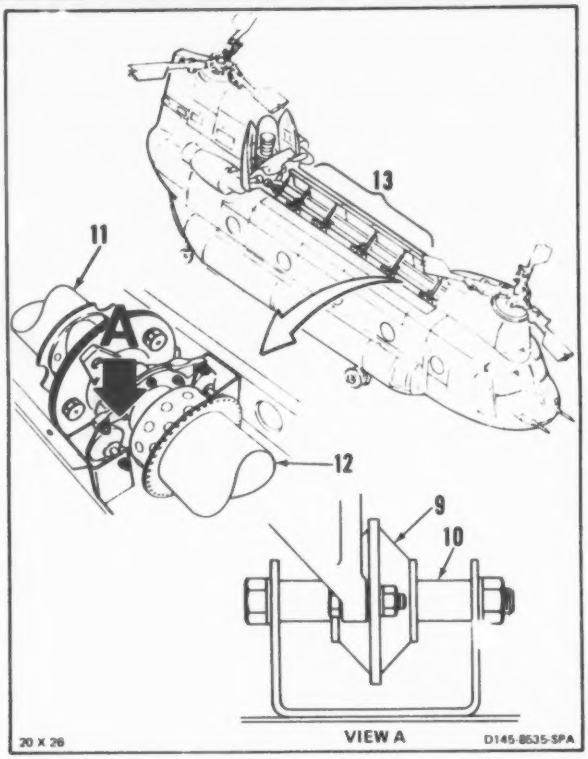
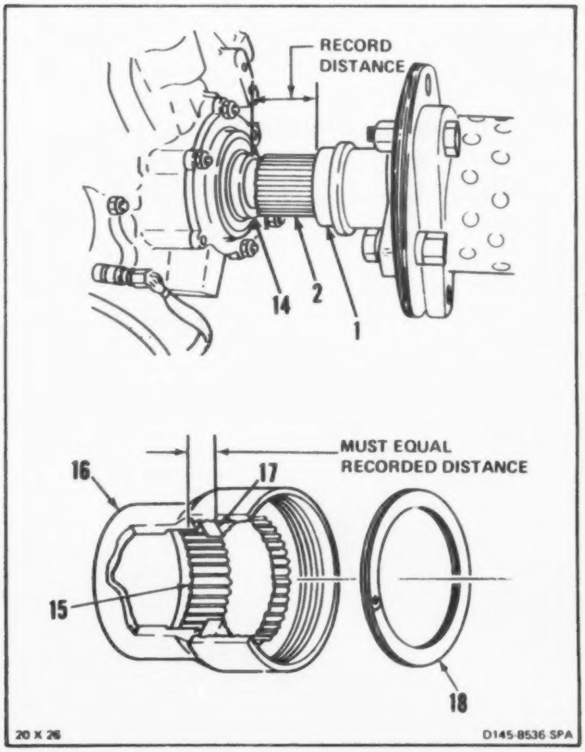
## 6-20 ALIGN FORWARD DRIVE SHAFTING (Continued) 6-20

3. **Check position of mount (9)** on bushing (10) on either side between No. 3 drive shaft (11) and No. 4 drive shaft (12). **Mount shall be centered on bushing within 0.060 inch.** Move entire drive shafting assembly (13) forward or aft as needed to position mount.


13
11
A
12
9
10
20 X 26
VIEW A
D145-8535-SPA

4. **Measure distance between aft end of adapter assembly (1) and forward face of shoulder (14)** on combining transmission output shaft (2). Record measurement.
5. **Measure distance between end of splines (15) on** retainer (16) **and outer face of threaded ring (17)** within retainer. Remove retaining ring (18) and **screw threaded ring in or out until this distance equals distance recorded in step 4.**
6. Install retaining ring (18).


RECORD DISTANCE
14
2
1
MUST EQUAL RECORDED DISTANCE
16
17
15
18
20 X 26
D145-8536 SPA

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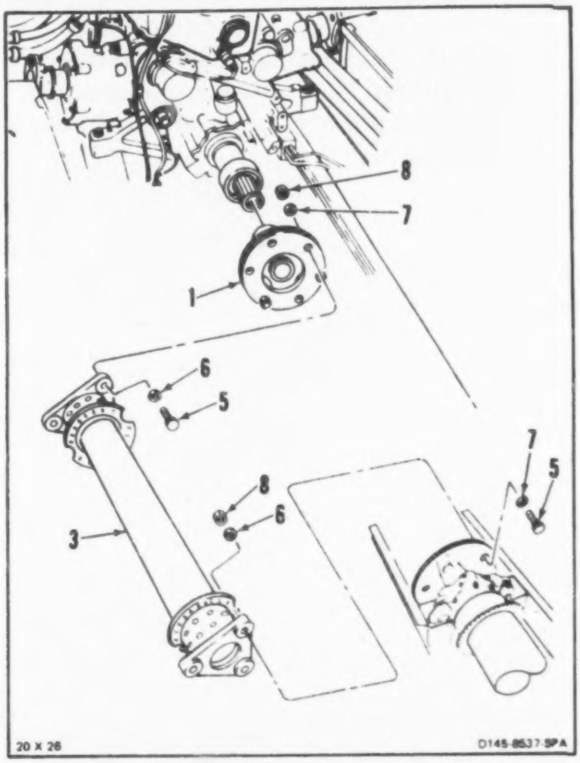
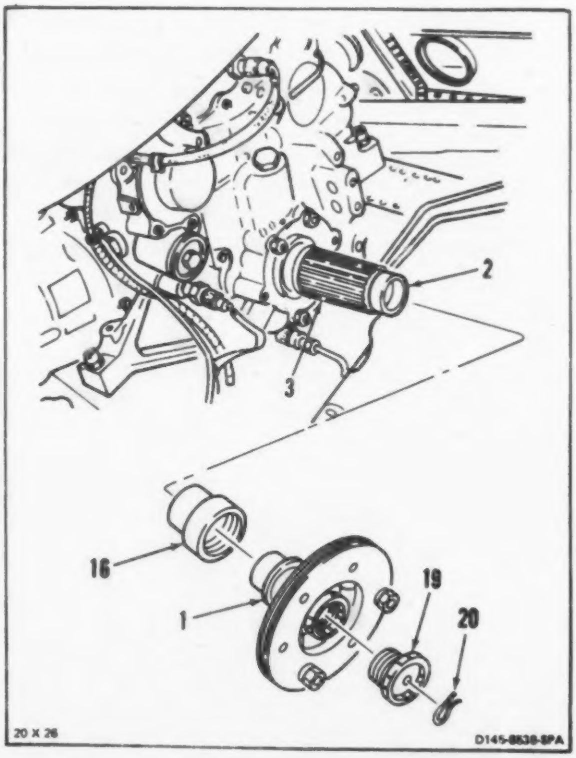
## 6-20 ALIGN FORWARD DRIVE SHAFTING (Continued) 6-20

7. Remove nuts (8), washers (6 and 7) and bolts (5) from both ends of shaft (3). **Remove shaft.**
8. **Remove adapter assembly (1).**


8
7
1
6
5
7
5
8
6
3
20 X 26
D145-8537-SPA

9. **Install adapter assembly (1), with retainer (16), retainer (19), and lockring (20)** on splines (3) of output shaft (2) (Task 6-9).


2
3
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20 X 26
D145-8538-SPA

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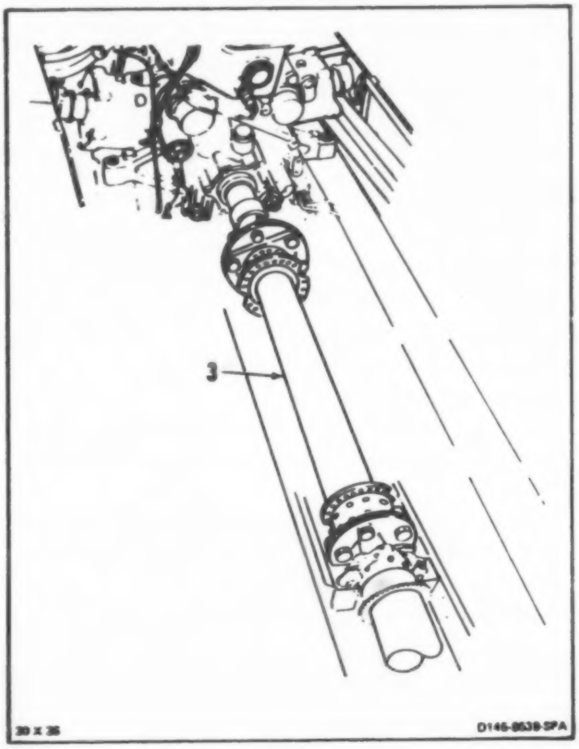
## 6-20 ALIGN FORWARD DRIVE SHAFTING (Continued) 6-20

10. **Install No. 7 drive shaft (3)** (Task 6-19).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).

**END OF TASK**

## 6-21 REMOVE AFT DRIVE SHAFTING

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit
NSN 5180-00-323-4692
Workstand (2)

***Materials:***

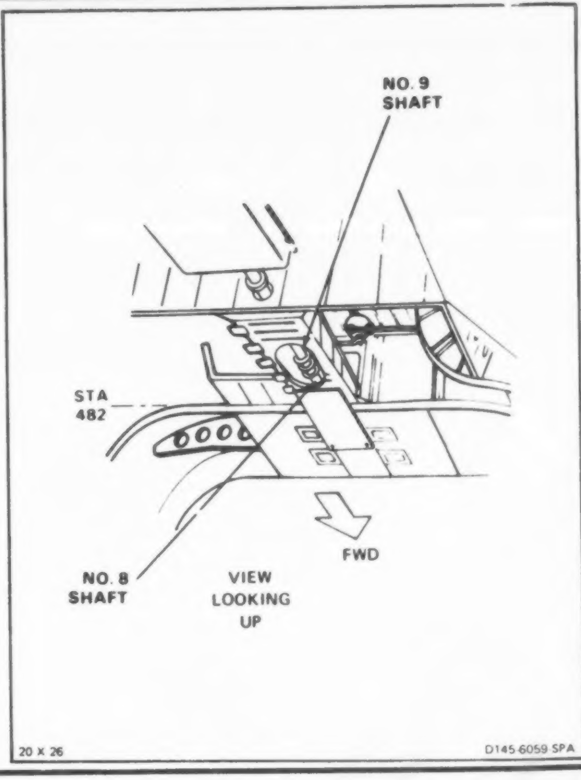
None

***Personnel Required:***

Medium Helicopter (2)

***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shaft Access Panel Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



### *REMOVE NO. 9 SHAFT*

**CAUTION**

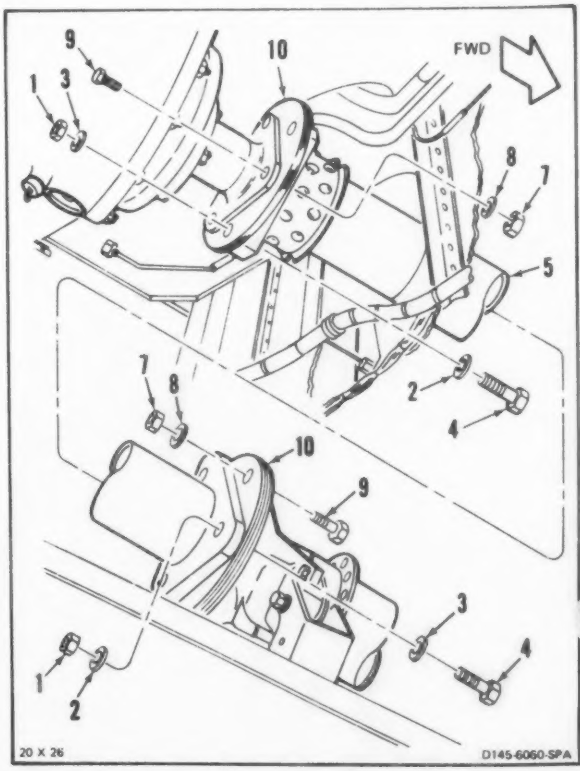
**Do not allow bolts to turn when removing nuts. If bolts turn, damage to bolts and plates can result.**

1. **Remove** nuts (1), washers (2), or special washers (3), and **three bolts (4)** at each end of No. 9 shaft (5). During removal, have helper hold head of bolts with wrench (6).

**CAUTION**

**If more than one bolt on adapter assembly is removed, assembly will have to be balanced.**

2. **Remove one** nut (7), special washer (8), and **bolt (9)** from adapter assembly (10) **at each end of shaft (5)** for clearance. During removal, have helper hold bolts.
3. Remove shaft (5).



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## 6-21 REMOVE AFT DRIVE SHAFTING (Continued) 6-21

***REMOVE NO. 8 SHAFT***

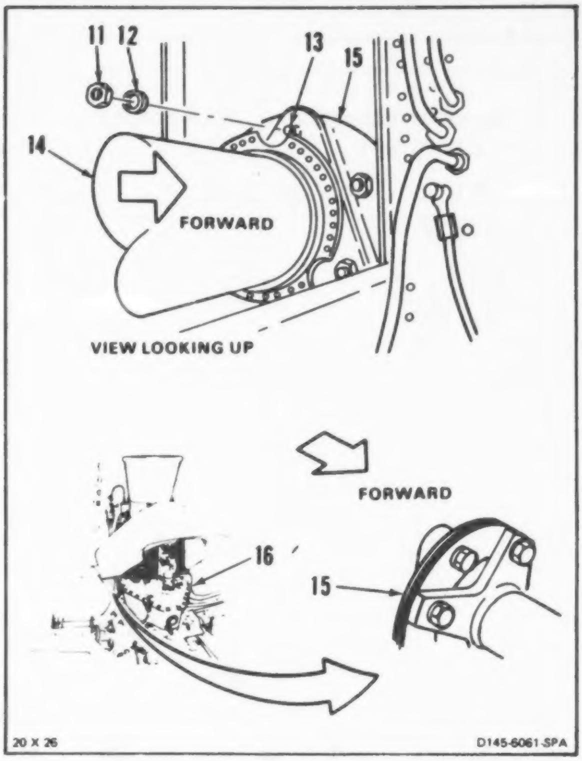
**CAUTION**

**Do not allow bolts to turn while removing nuts. If bolts turn, damage to bolts and plates can result.**

**NOTE**

Helper reaches bolts from top of helicopter.

4. **Remove three nuts (11) and washers (12)** from three bolts (13) that secure No. 8 shaft (14) to adapter assembly (15) aft of combining transmission (16). During removal, have helper hold head of bolts with wrench. Do not remove bolts at this time.

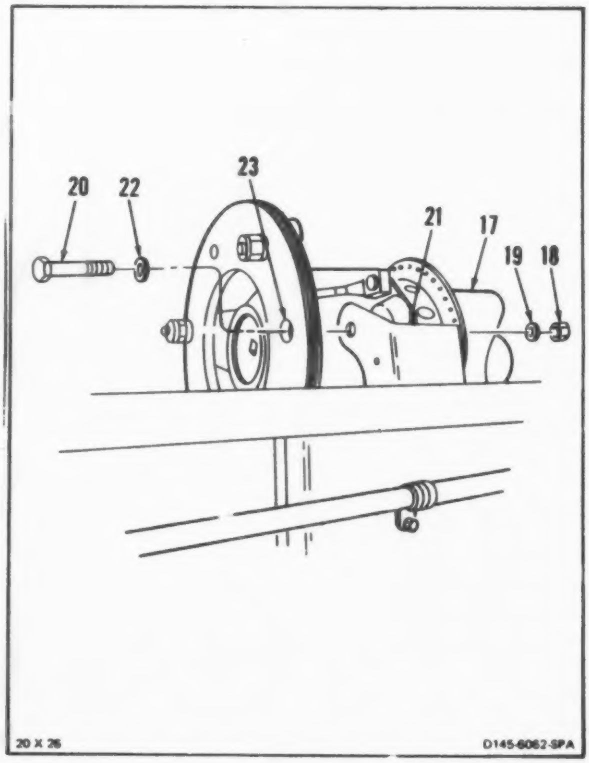

11
12
13
15
14
FORWARD
VIEW LOOKING UP
FORWARD
16
15
20 X 26
D145-6061-SPA

5. Have helper suppport shaft (17). Remove nut (18) and washer (19) from bolt (20). Work through bracket (21) at each side of shaft.

**NOTE**

Rotate shaft as needed to align hole with bolts.

6. **Remove two bolts (20) and washers (22)** through one of three holes (23).


23
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D145-6062-SPA

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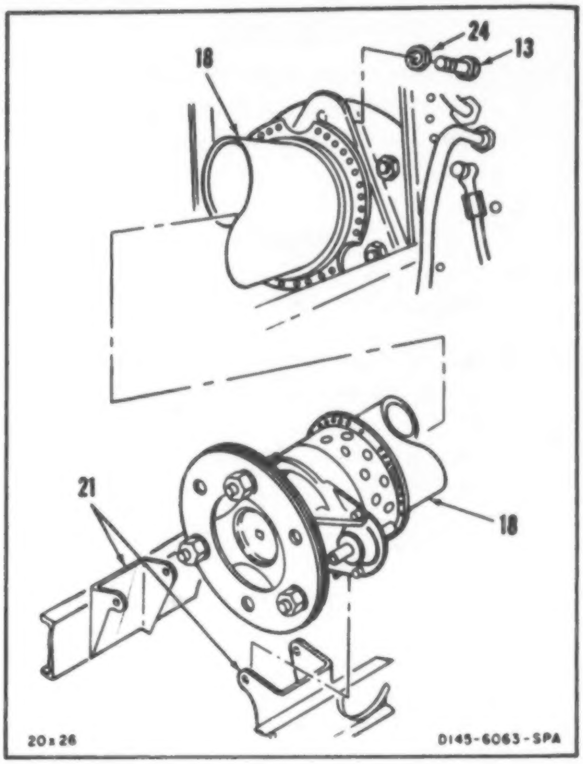
## 6-21 REMOVE AFT DRIVE SHAFTING (Continued) 6-21


24
13
18
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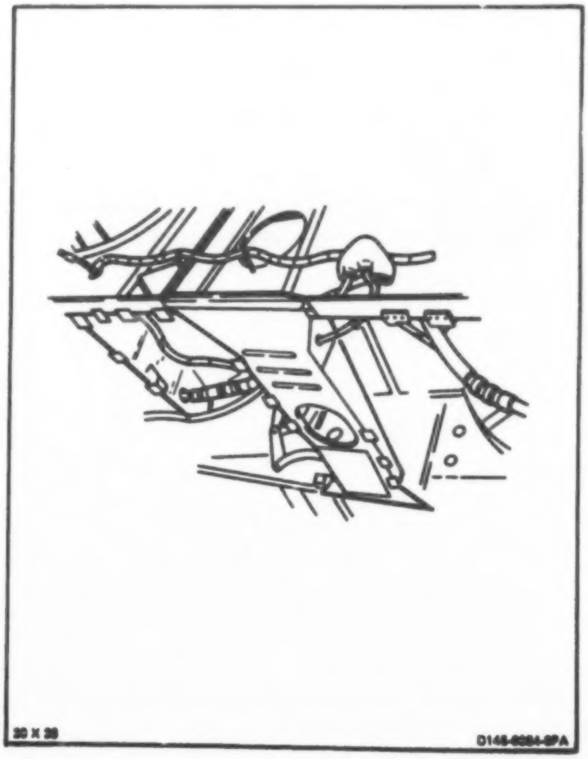
18
20x26
D145-6063-SPA

7. **Remove three bolts (13)** and special washers (24).
8. Lift shaft (18) out of brackets (21). **Remove shaft.**

FOLLOW-ON MAINTENANCE:

None


20 X 28
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**END OF TASK**

## 6-22 REMOVE COMBINING TRANSMISSION AFT OUTPUT SHAFT ADAPTER ASSEMBLY 6-22

INITIAL SETUP

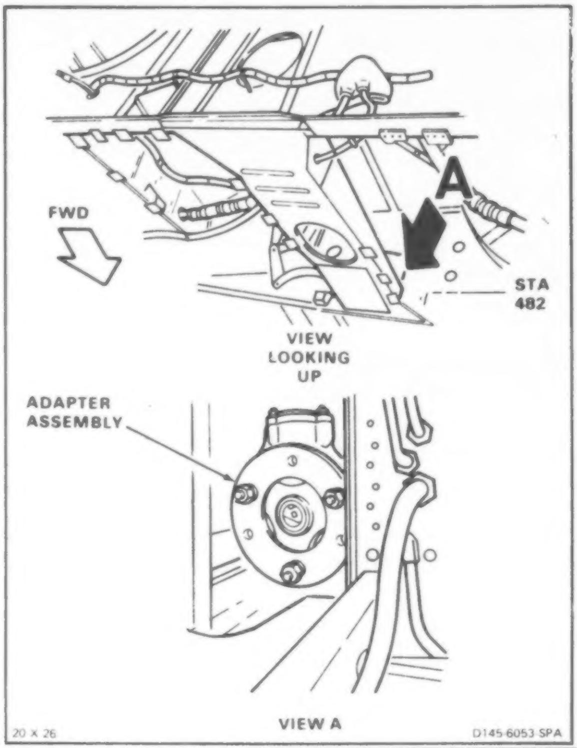
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Workstand

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shafting Removed (Task 6-21)
Tiedown Line Installed on One Forward Rotor Blade (Task 1-26)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VIEW LOOKING UP
ADAPTER ASSEMBLY
VIEW A
20 X 26
D145-6053-SPA

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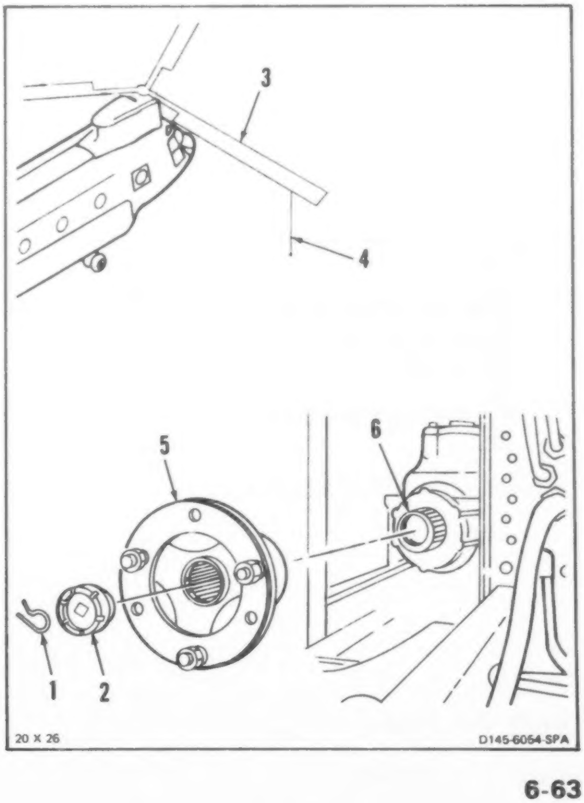
1. **Remove lockring (1)** from retainer (2).
2. Have helper hold rotor blade (3) in position with tiedown line (4).
3. **Remove retainer (2)** from adapter assembly (5).
4. **Remove adapter assembly (5)** from output shaft (6).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4
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2
20 X 26
D145-6054-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-23 REMOVE AFT TRANSMISSION ADAPTER ASSEMBLY 6-23

INITIAL SETUP

***Applicable Configurations:***
All

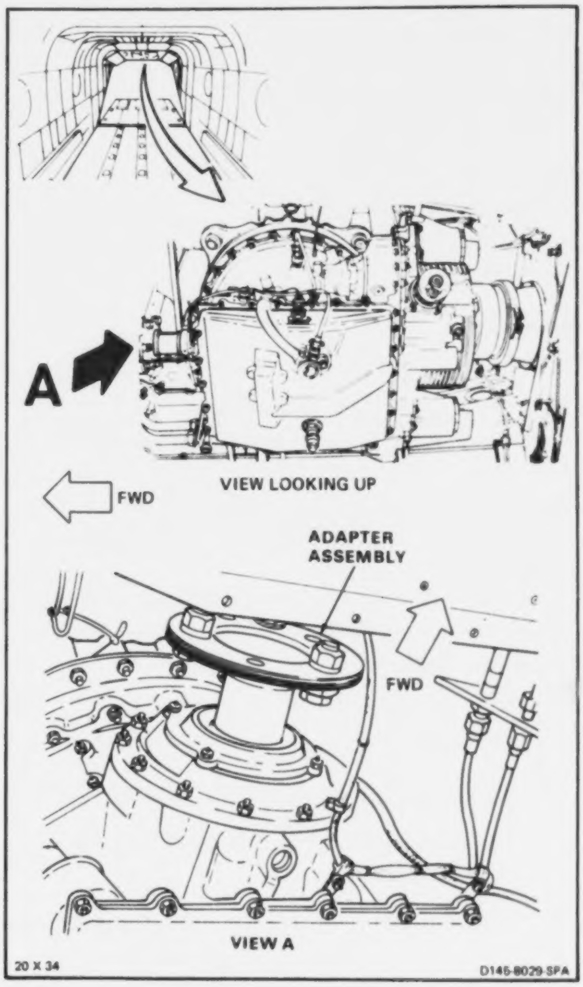
***Tools:***
Workstand

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***

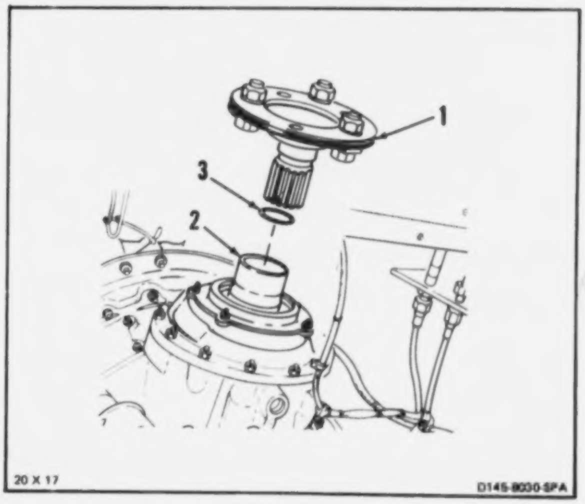
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
No. 9 Drive Shaft Removed (Task 6-21)


A
FWD
VIEW LOOKING UP
ADAPTER ASSEMBLY
FWD
VIEW A
20 X 34
D145-8029-SPA

1. **Remove adapter assembly (1)** from transmission input shaft (2). Do not disturb position of input shaft.
2. **Remove packing (3)** from adapter assembly (1).

FOLLOW-ON MAINTENANCE:

None


1
3
2
20 X 17
D145-8030-SPA

**END OF TASK**

## 6-24 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT ADAPTER ASSEMBLY 6-24

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds
Workstand

***Materials:***

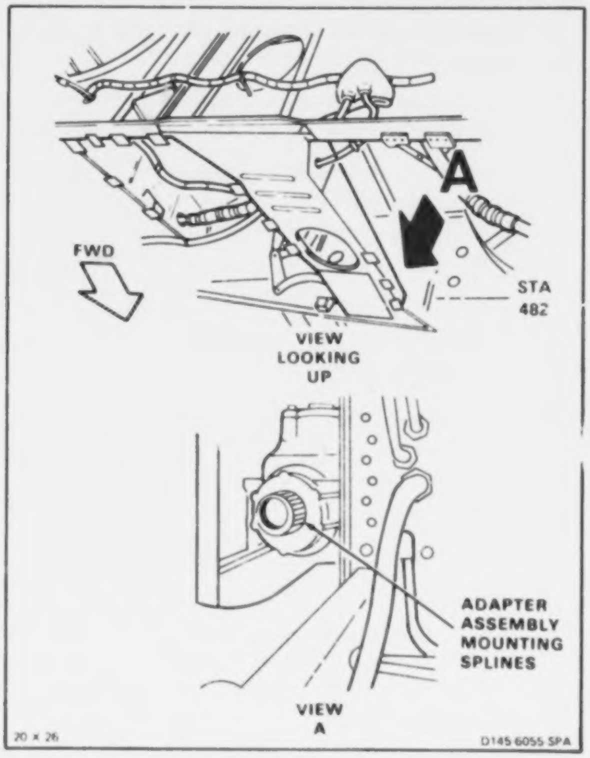
Dry Cleaning Solvent (E162)
Grease (E190)
Cloths (E120)
Gloves (E186)
Grease (E75)

***Personnel Required:***

Medium Helicopter Repairer
Inspector

***References:***

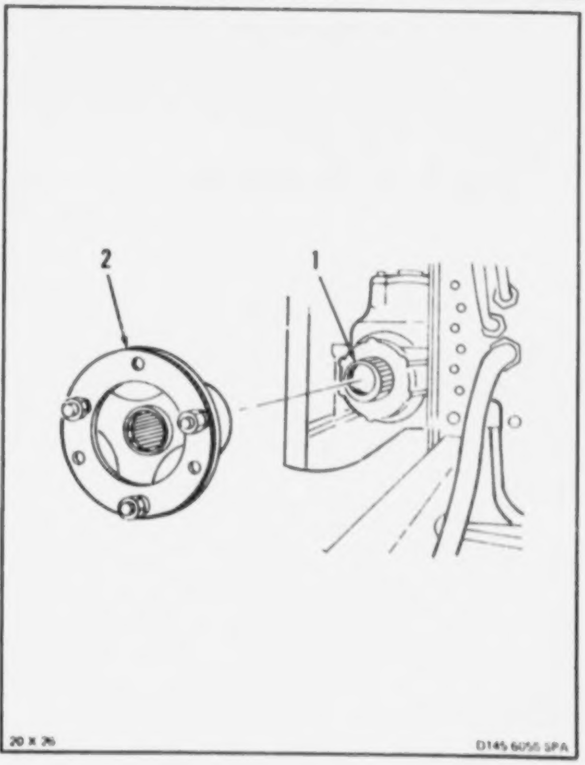
TM 55-1520-240-23P



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean splines on aft output shaft (1) and adapter assembly (2). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186) and goggles.
2. Pack splines on shaft (1) and adapter assembly (2) with grease (E190).
3. **Install adapter assembly (2)** on shaft (1). Wipe off excess grease with cloths (E120).



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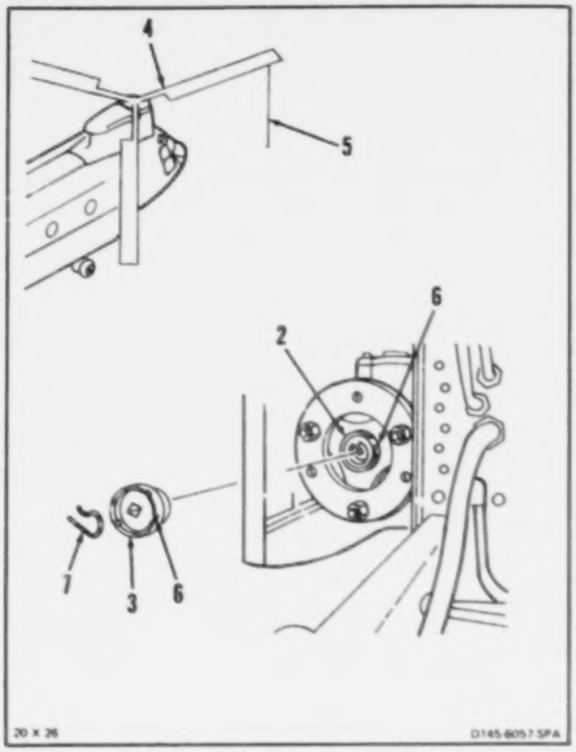
## 6-24 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT ADAPTER ASSEMBLY (Continued) 6-24

4. **Coat thread of retainer (3) with grease (E75).**
5. Have helper hold rotor blade (4) in position with tiedown line (5).
6. **Install retainer (3)** in adapter assembly (2). **Torque retainer to 825 inch-pounds.** Continue torquing to align holes (6) in retainer (3) and adapter assembly (2).
7. **Install lockring (7).** Check that lockring protrudes through adapter assembly (2) at least 0.060-inch.

***INSPECT***

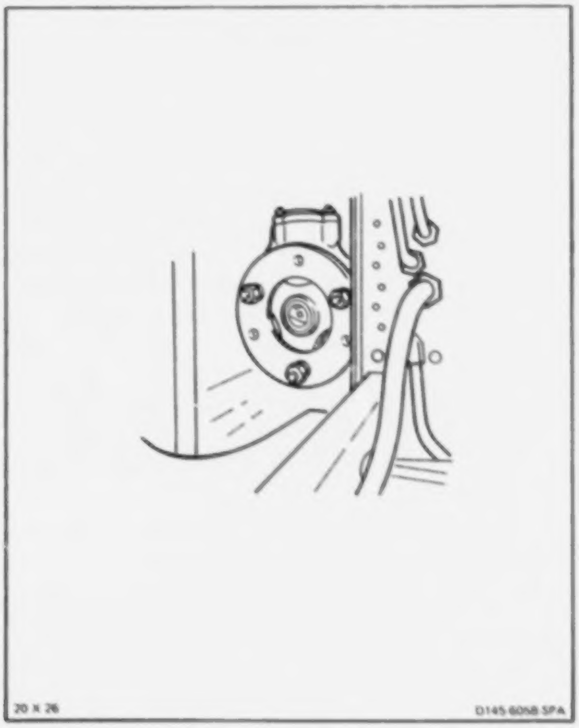


FOLLOW-ON MAINTENANCE:

Install aft drive shafting (Task 6-29).

Remove tiedown line from rotor blade (Task 1-26).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-25 INSTALL AFT TRANSMISSION ADAPTER ASSEMBLY 6-25

INITIAL SETUP

***Applicable Configurations:***
All

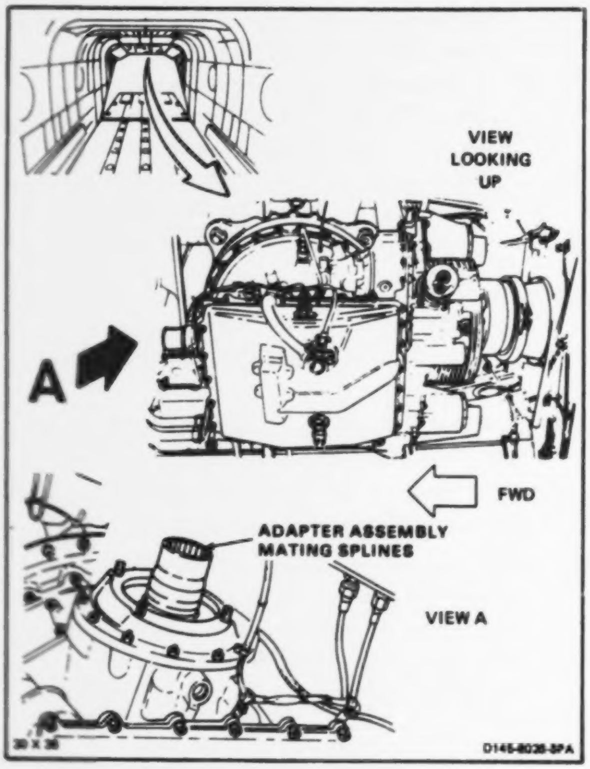
***Tools:***
Workstand

***Materials:***
Dry Cleaning Solvent (E162)
Grease (E190)
Cloths (E120)
Gloves (E186)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P


VIEW
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ADAPTER ASSEMBLY
MATING SPLINES
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D145-8026-3PA

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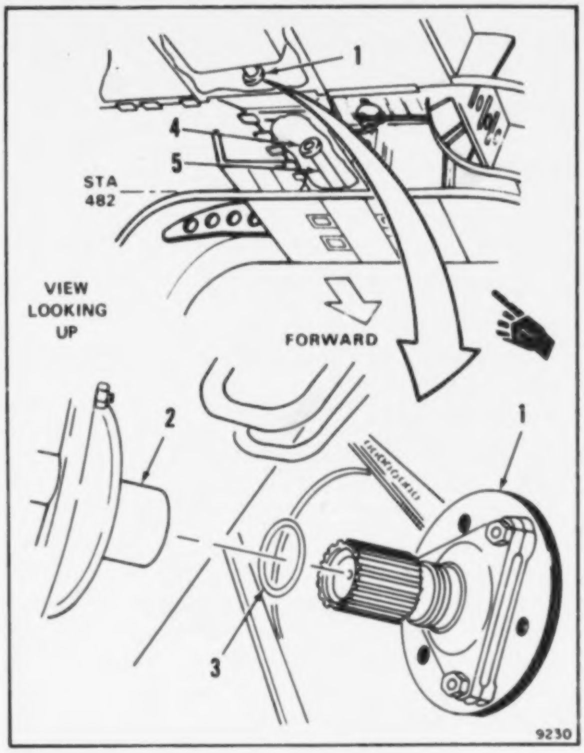
## 6-25 INSTALL AFT TRANSMISSION ADAPTER ASSEMBLY (Continued) 6-25

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.**

1. Clean splines of adapter assembly (1) and input shaft (2). Use dry cleaning solvent (E162) and clean cloths (E120). Use gloves (E186).
2. Coat packing (3) with grease (E190). **Install packing** on adapter assembly (1).
3. **Pack splines** of input shaft (2) and adapter assembly (1) **with grease (E190).**
4. Align adapter assembly (1) with adapter assembly (4) of No. 8 drive shaft (5). **Install adapter assembly** in input shaft (2). Make sure assembly is fully seated. Do not disturb position of input shaft (2) or No. 8 drive shaft.
5. Wipe off excess grease with cloths (E120).



FOLLOW-ON MAINTENANCE:

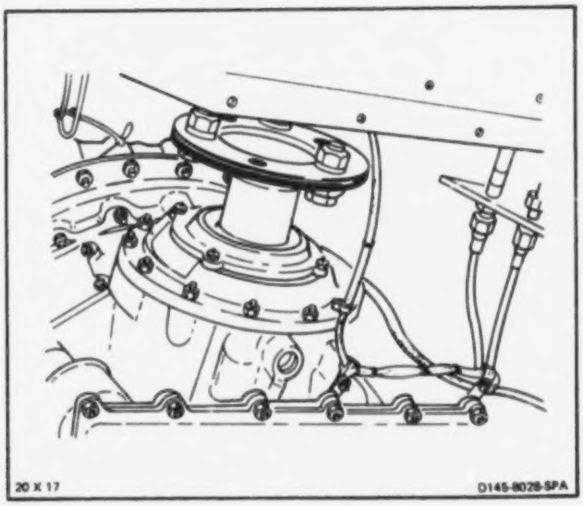
Phase rotor blades (Task 6-28).

Install No. 9 drive shaft (Task 6-29).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-26 REMOVE AFT DRIVE SHAFT MOUNT 6-26

INITIAL SETUP

***Applicable Configurations:***
All

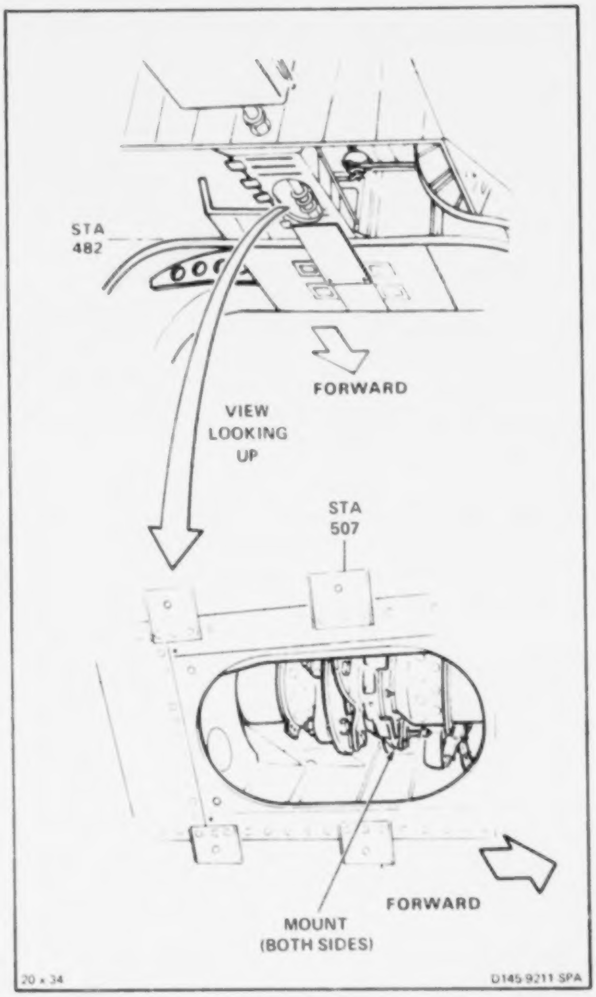
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

***Materials:***
None

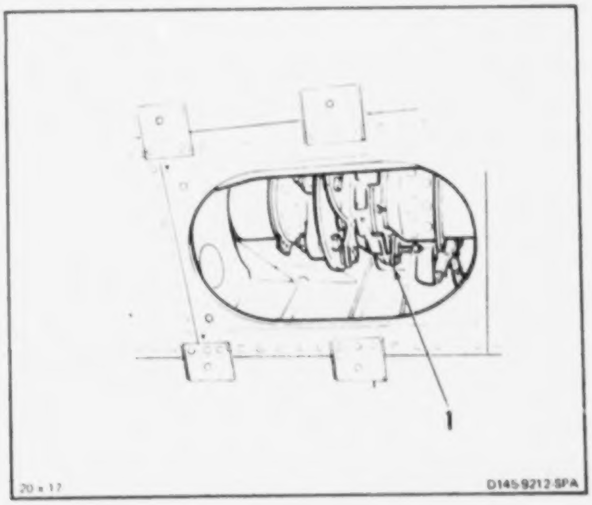
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer

***References:***
Task 6-14

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shaft Access Panel Open (Task 2-2)


STA 482
FORWARD
VIEW LOOKING UP
STA 507
FORWARD
MOUNT (BOTH SIDES)
20 x 34
D145-9211 SPA

1. Remove either mount (1) in same way as forward drive shaft mount (Task 6-14).


1
20 x 17
D145-9212 SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-27 INSTALL AFT DRIVE SHAFT MOUNT 6-27

INITIAL SETUP

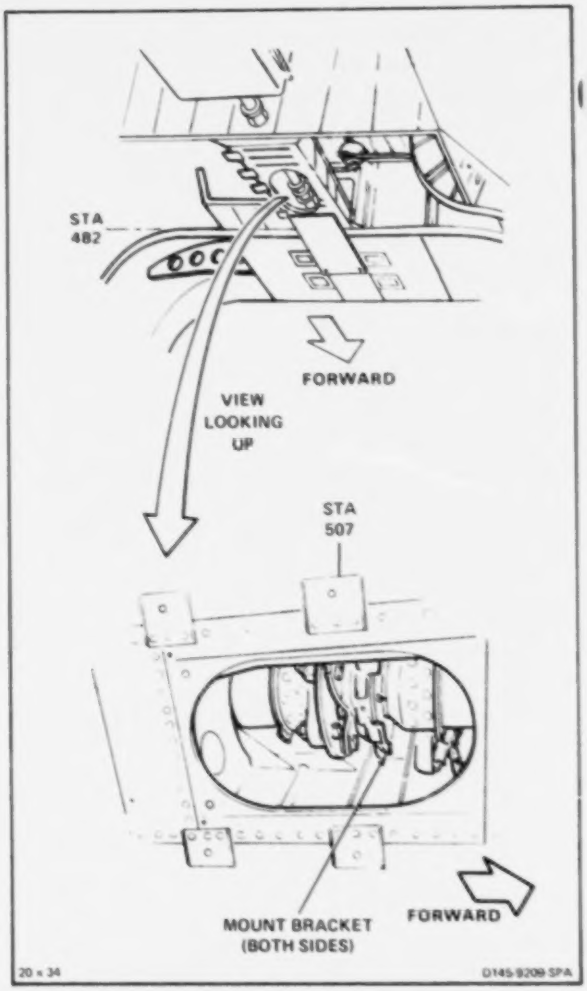
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 0 to 600 Foot-Pounds
Workstand

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
Task 6-15


STA 482
FORWARD
VIEW LOOKING UP
STA 507
MOUNT BRACKET (BOTH SIDES)
FORWARD
20 x 34
0145-9209-SPA

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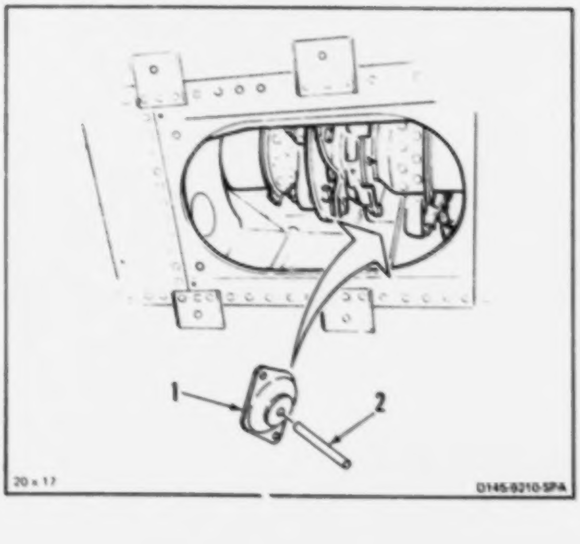
1. Install left or right mount (1), with bushing (2), in same way as forward drive shaft mount (Task 6-15).


1
2
20 x 17
0145-9210-SPA

FOLLOW-ON MAINTENANCE:

Close aft drive shaft access panel (Task 2-2).

**END OF TASK**

## 6-28 PHASE ROTARY-WING BLADES 6-28

INITIAL SETUP

*Applicable Configurations:*
All

*Tools:*
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Phasing Block (2) (Appx E-5)

*Materials:*
None

*Personnel Required:*
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

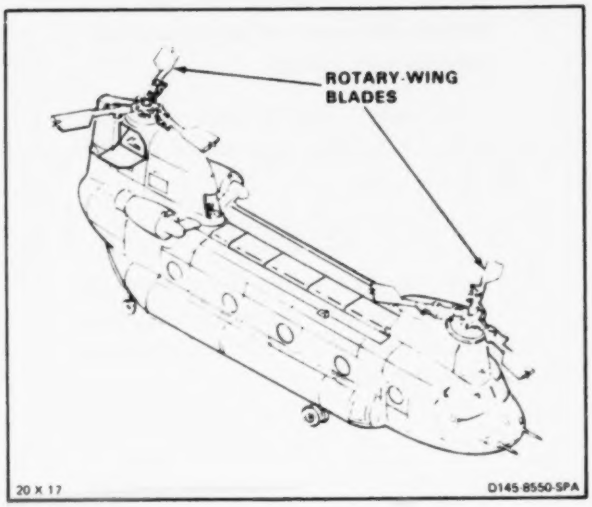
*References:*
Task 6-29

*Equipment Condition:*
Battery Disconnected (Task 1-39)
Electrical Power Off
No. 9 Drive Shaft Removed (Task 6-21)
Tiedown Line Installed on One Forward and One Aft Blade (Task 1-26)
Forward Transmission Fairing Left Work Platform Open (Task 2-2)
Aft Pylon Right Work Platform Open (Task 2-2)

*General Safety Instructions:*

**WARNING**

**Improper phasing can result in injury to personnel and serious damage to helicopter.**



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**CAUTION**

**Make sure forward and aft blades do not collide. Damage to blades can result.**

1. Rotate forward and aft rotary wing heads (1 and 2) to **position one blade (3) forward on each head.**

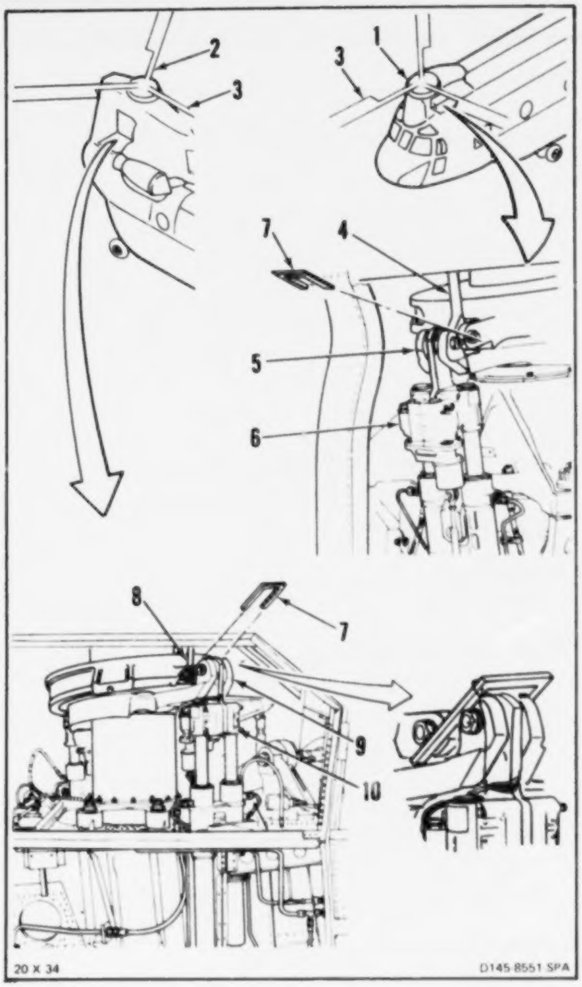
**WARNING**

**Use only swiveling actuators to phase blades. Do not use pivoting actuators. Improper phasing will result.**

**NOTE**

Swiveling actuator is on left side of forward head and right side of aft head.

2. Have helper rotate forward blades to **align one forward pitch link (4) with upper mounting lug (5) of swiveling actuator (6). Install phasing block (7)** around link and lug. Check that one blade (3) still points forward.
3. Have helper rotate aft blades to **align one aft pitch link (8) with upper mounting lug (9) of swiveling actuator (10). Install phasing block (7)** around link and lug. Check that one blade (3) still points forward.
4. **Install No. 9 drive shaft** (Task 6-29).
5. **Remove two phasing blocks (7).**
6. Rotate blades three complete revolutions in the leading direction. Check phasing by installing two phasing blocks (7) as in steps 2. and 3. Remove blocks.



***INSPECT***

***GO TO NEXT PAGE***

## 6-28 PHASE ROTARY-WING BLADES (Continued) 6-28

FOLLOW-ON MAINTENANCE:

Close forward transmission fairing left work platform (Task 2-2).

Close aft pylon work platform (Task 2-2).

Remove tiedown lines from rotary-wing blades (Task 1-26).

**END OF TASK**

## 6-29 INSTALL AFT DRIVE SHAFTING

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Workstand (2)
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds

***Materials:***

Oil (E254)

***Parts:***

Washers

***Personnel Required:***

Medium Helicopter Repairer (2)
Inspector

***References:***

TM 55-1520-240-23P
Task 6-28

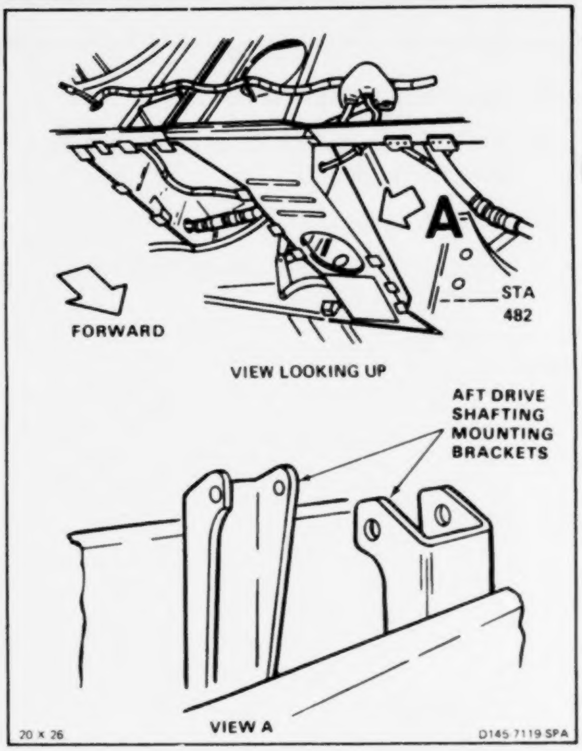
***General Safety Instructions:***

**WARNING**

**Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

**Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**


A
STA 482
FORWARD
VIEW LOOKING UP
AFT DRIVE SHAFTING MOUNTING BRACKETS
VIEW A
20 x 26
D145-7119 SPA

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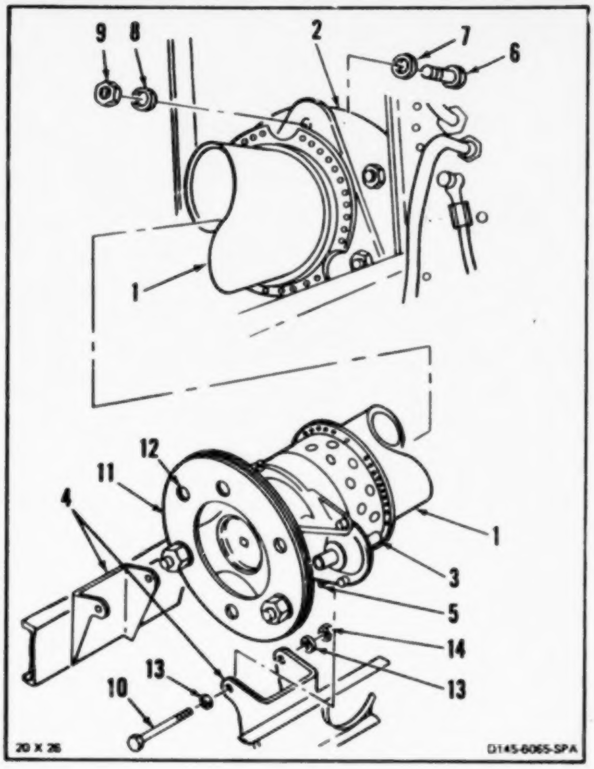
## 6-29 INSTALL AFT DRIVE SHAFTING (Continued) 6-29

### *INSTALL NO. 8 SHAFT*

1. **Position shaft (1)** against combining transmission adapter assembly (2). Position two bushings (3) in brackets (4). Check that grease fitting (5) points down.
2. Have helper support shaft (1). Coat thread of three bolts (6) with oil (E254). **Install bolts,** head forward, and special washers (7) through adapter assembly (2) and shaft. **Loosely install** three washers (8) and **nuts (9).**
3. Coat thread of two bushing bolts (10) with oil (E254). Turn adapter assembly (11) as needed to align holes (12) in adapter assembly with bushings (3). **Install two bolts (10)** and washers (13) through bushing on each side of shaft.
4. Install washers (13) and nuts (14) on two bolts (10). **Torque nuts to 155 inch-pounds.**



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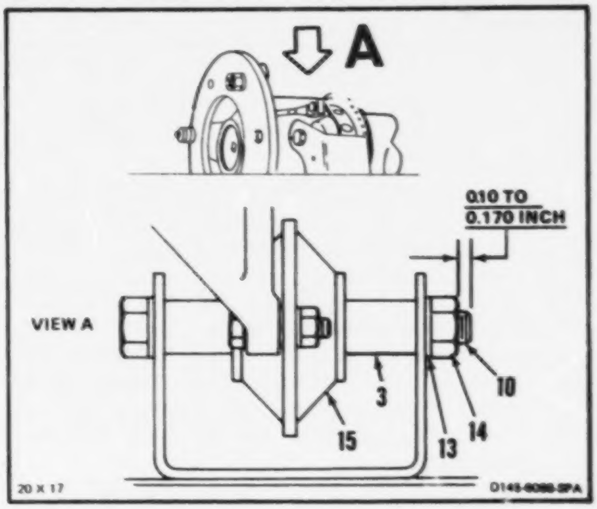
5. **Check bolts (10).** There shall be **0.10 to 0.170-inch** of bolt extending through nut (14). Install another washer (13) or a thinner washer if needed.
6. **Check mounts (15)** for freedom of motion on bushings (3). There shall be no binding of mounts on bushings.


A
0.10 TO
0.170 INCH
VIEW A
10
3
14
15
13
20 X 17
D145-6066-SPA

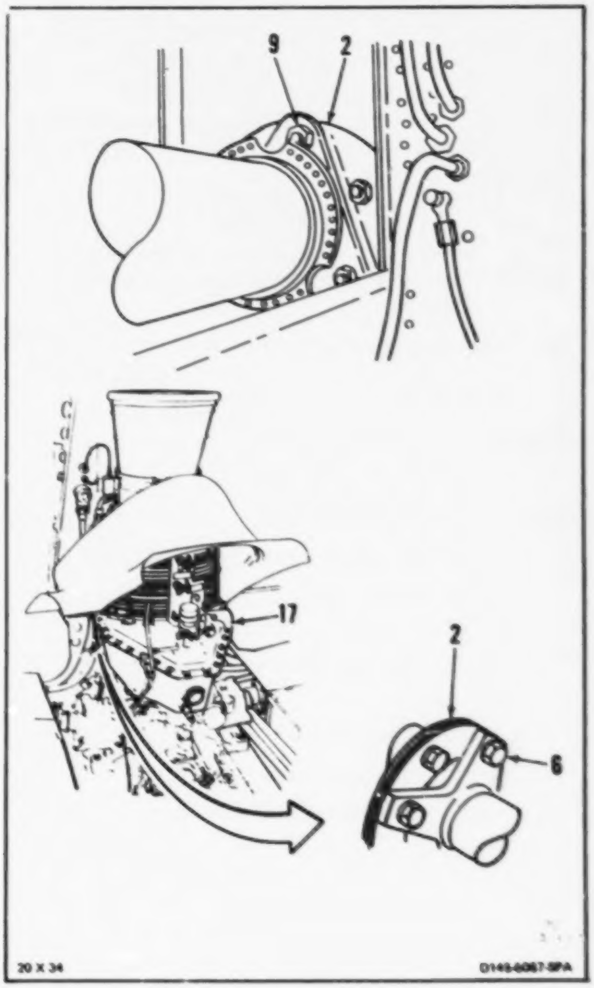
**CAUTION**

**Do not allow bolts to turn when torquing nuts. If bolts turn, damage to bolts and plates can result.**

**NOTE**

Helper reaches bolts from top of helicopter.

7. Have helper hold head of three bolts (6) at adapter assembly (2) aft of combining transmission (17) with wrench. **Torque nuts (9) to 1050 inch-pounds.**
8. **Phase rotor blades** (Task 6-28).


9
2
17
2
6
20 X 34
D145-6067-SPA

*GO TO NEXT PAGE*

### *INSTALL NO. 9 SHAFT*

**NOTE**

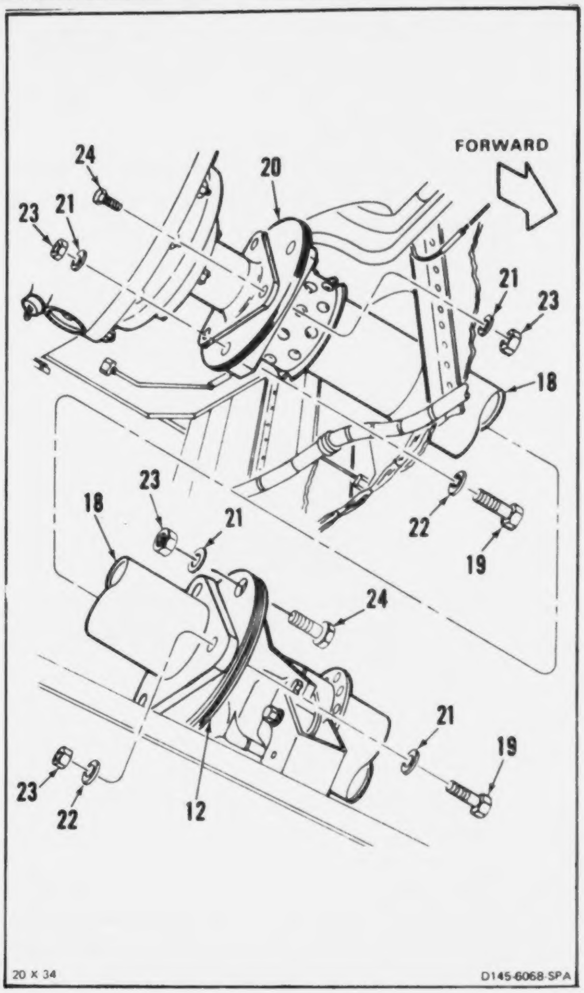
If position of adapter assemblies is changed, rotor blades will have to be phased again.

9. Have helper support No. 9 shaft (18). Remove two bolts (19) inserted during phasing. Do not disturb positions of adapter assemblies (12 and 20).
10. Coat thread of six bolts (19) with oil (E254). **Install three bolts,** heads forward, and special washers (21) **through adapter assembly (12) and shaft (18). Install three bolts,** heads forward, and washers (22) **through shaft (18) and adapter assembly (20).**
11. Loosely install three washers (22) and nuts (23) on forward bolts (19). Loosely install three special washers (21) and nuts (23) on aft bolts.
12. Coat thread of two bolts (24) with oil (E254). **Install bolts,** heads away from each other **through adapter assemblies (12 and 20).** Install special washer (21) and nut (23) on each bolt.

**CAUTION**

**Do not let bolts turn. If bolts turn, damage to bolts and plates can result.**

13. Have helper hold head of six bolts (19) and two bolts (24) with wrench. **Torque eight nuts (23) to 1050 inch-pounds.**



### *INSPECT*

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

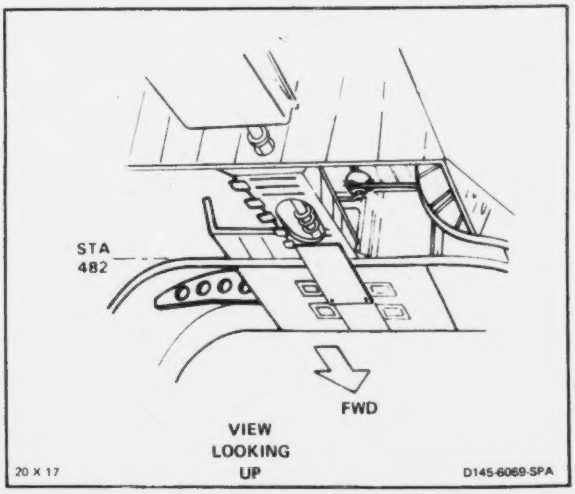
Close aft drive shaft access panel (Task 2-2).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon doors (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-30 REMOVE ENGINE DRIVE SHAFT 6-30

INITIAL SETUP

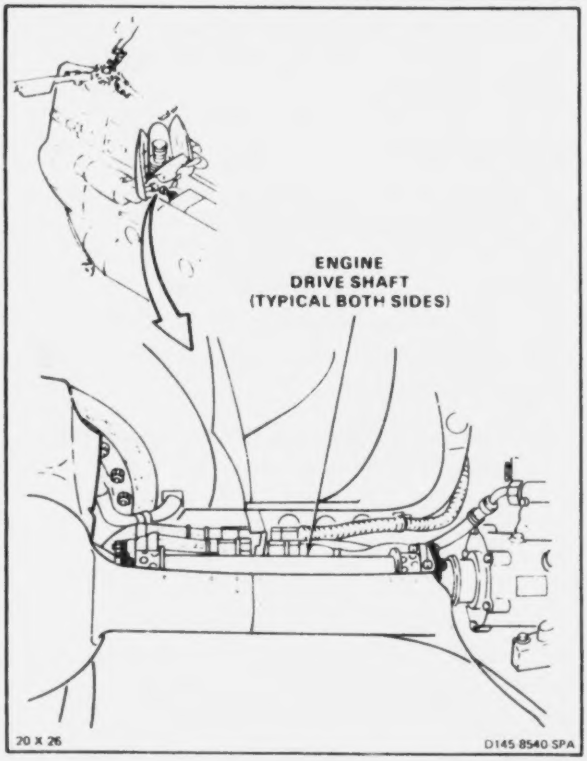
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Cloths (E120)
Barrier Material (E80)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Raised (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)



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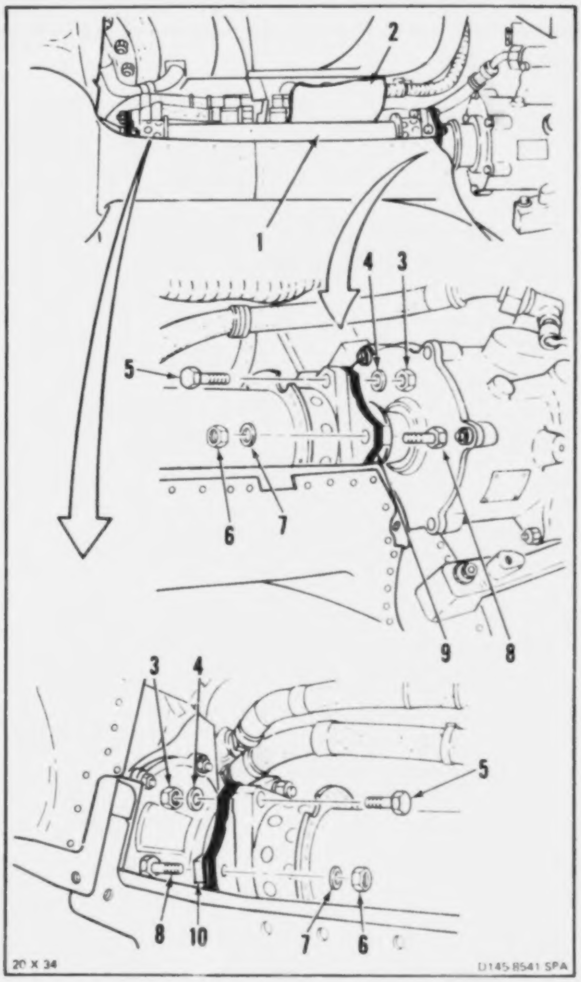
## 6-30 REMOVE ENGINE DRIVE SHAFT (Continued) 6-30



**NOTE**

Remove left or right engine drive shaft in same way. Right shaft shown here.

### *REMOVE SHAFT*

1. Support shaft (1) with pad (2) of barrier material (E80) or cloths (E120).

**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.**

2. **Remove three nuts (3), washers (4), and bolts (5)** from each end of shaft (1). During removal, hold head of bolts with wrench.

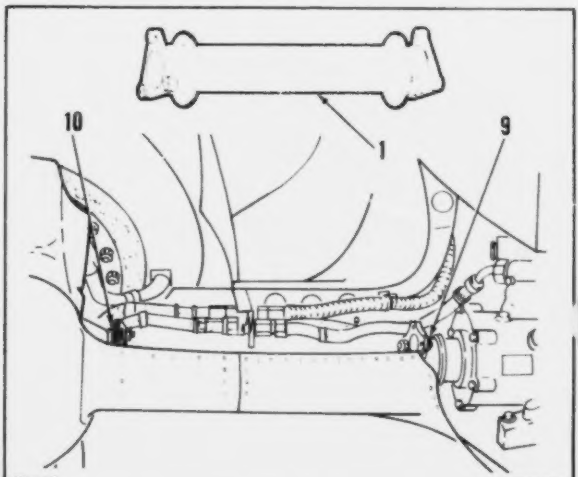
**CAUTION**

**Do not allow bolts to turn. If bolt turns, bolts and adapter assemblies can be damaged.**

**NOTE**

If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

3. Remove one nut (6), washer (7), and bolt (8) from adapter assembly (9 and 10) at each end of shaft (1). During removal, hold head of bolts with wrench.
4. **Lift shaft (1)** from between adapter assemblies (9 and 10). Remove shaft.
5. If shaft (1) will be reinstalled, go to FOLLOW-ON MAINTENANCE. If shaft will be replaced, go to step 6.



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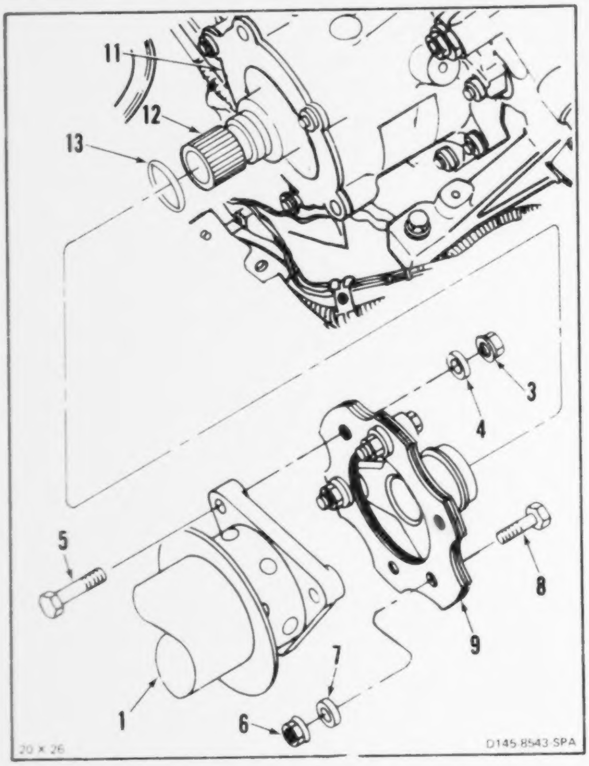
## 6-30 REMOVE ENGINE DRIVE SHAFT (Continued) 6-30

### *REMOVE ADAPTER ASSEMBLIES*

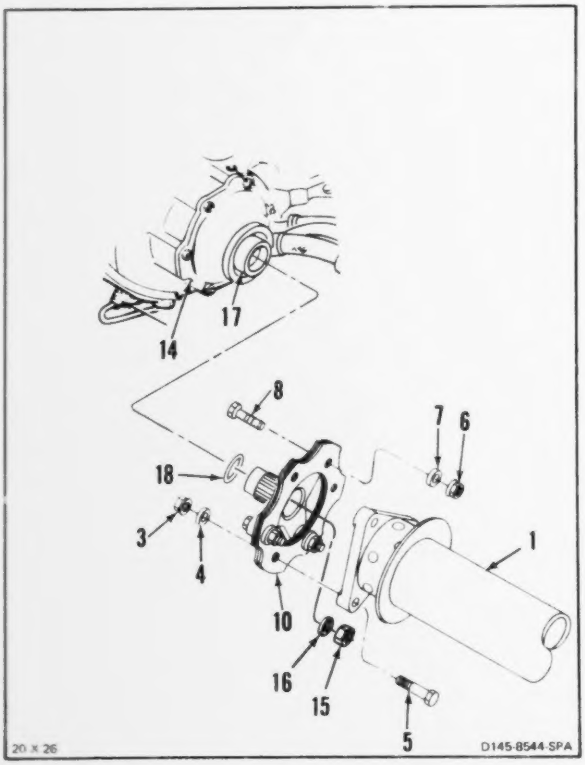
**NOTE**

Shaft and adapter assemblies are balanced together and have the same serial number. If any one must be replaced, all three must be replaced as a unit.

6. **Remove adapter assembly (9)** from combining transmission (11) as follows:
   a. Pull adapter assembly (9) from splines of input shaft (12).
   b. Remove packing (13) from shaft (12).
   c. Loosely **install adapter assembly (9) on drive shaft (1)** with three bolts (5), washers (4), and nuts (3). Install bolt (8), washer (7), and nut (6).



7. Remove adapter assembly (10) from engine transmission (14) as follows:
   a. **Remove nut (15) and washer (16).**
   b. **Pull adapter assembly (10) from splines** of output shaft (17). Remove packing (18) from adapter assembly.
   c. Loosely **install adapter assembly (10) on drive shaft (1)** with three bolts (5), washers (4), and nuts (3). Install bolt (8), washer (7), and nut (6).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-30.1 INSPECT ENGINE DRIVE SHAFT 6-30.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

***Materials:***
Cloths (E120)

***Personnel Required:***
67U30 Inspector

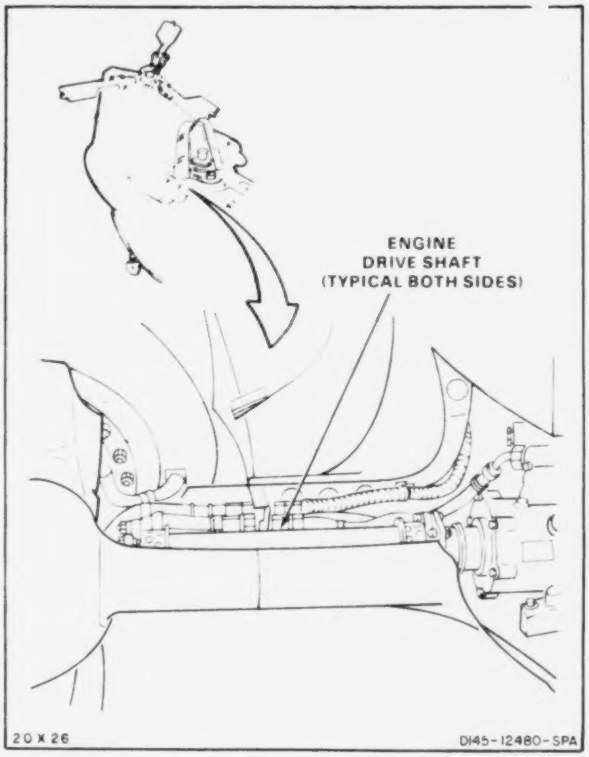
***References:***
TM 43-0103

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)

***General Safety Instructions:***

**WARNING**

**Keep clear of turning rotor blades when rotating drive shaft. Turning blades can injure personnel.**



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## 6-30.1 INSPECT ENGINE DRIVE SHAFT (Continued) 6-30.1

**NOTE**

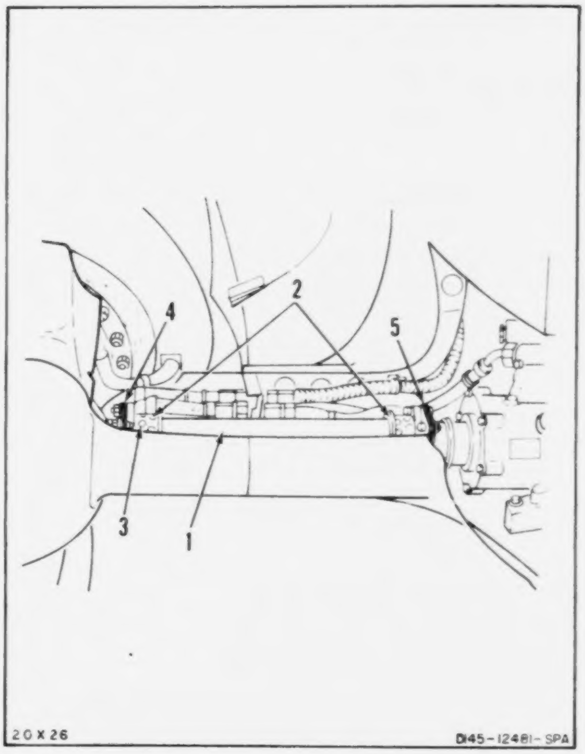
- Inspect left or right drive shaft in same way. Right shaft shown.
- Rotate shaft as needed to do a complete check.
- Shaft and adapter assemblies are balanced together. If one is damaged, all must be replaced.

1. **Inspect for damage** listed below. There shall be no such damage.
   - a. **Cracks in tube (1).**
   - b. **Dents in tube (1) more than 1/2 inch diameter or 0.020 inch deep.**
   - c. **Distance between any two dents less than 3.50 inches.**
   - d. **More than one dent around tube (1) at any one point.**
   - e. **Distance between end flange (2) and any dent less than 1 inch.**
   - f. **Loose or cracked rivets (3) at ends of tube.**

**NOTE**

Adapter assemblies have a shotpeened surface. Damage cannot be repaired.

   - g. **Cracks, nicks, scratches, or gouges in adapter assemblies (4 and 5).** Use a four-power magnifying glass to check.



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h. **Cracks in plates (6).** Use a magnifying glass to check.

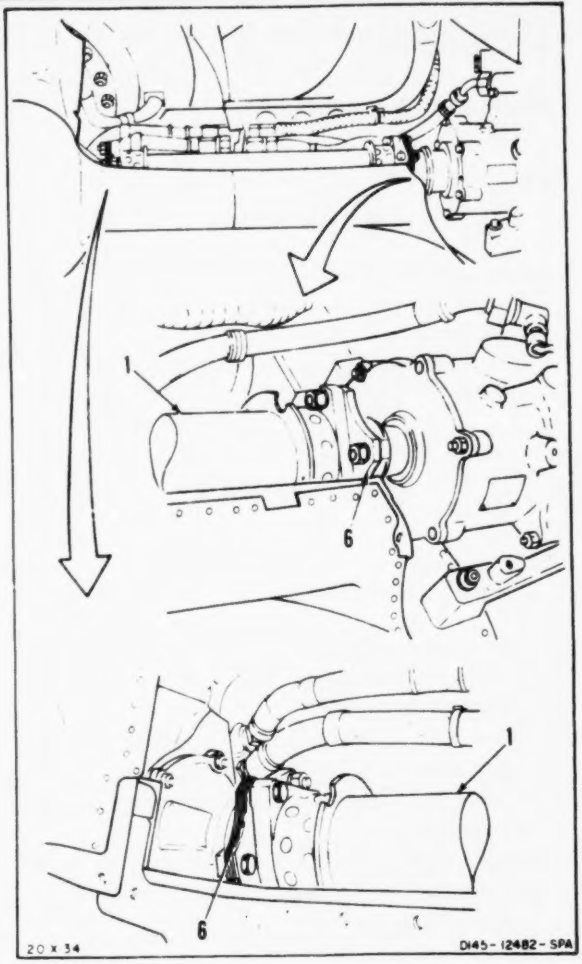
i. **Nicks on inside edge of plates (6).** Use a pointed scribe to check.

j. **Cracks, nicks, scratches, or gouges in dents in tube (1).** Use fluorescent inspection to check (TM 43-0103).

2. **Inspect** for nicks, scratches, or gouges in **tube (1) and plates (6).** Damage shall not be more than 0.010 inch deep.

**NOTE**

Bolts, P/N 145DS303-3, require nondestructive inspection, IAW TM 55-1500-335-23, for cracks every 100 flight hours. If installed on P/N 145D3500-12 assembly and if cracked or suspect, replace with new like bolt.



FOLLOW-ON MAINTENANCE:

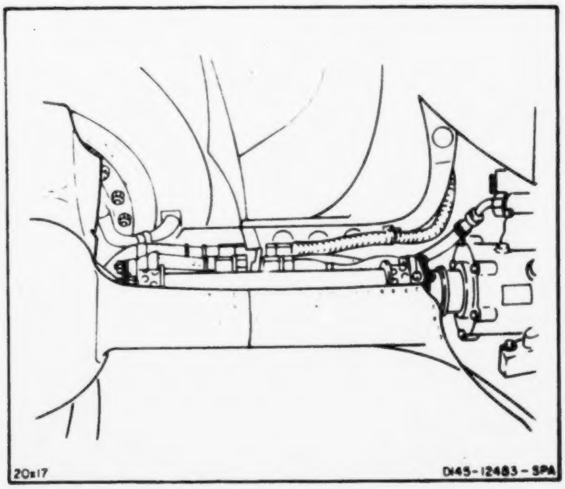
Close engine transmission fairing access cover (Task 2-2).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).

Install engine air inlet screen (Task 4-76).



END OF TASK

## 6-31 REPAIR ENGINE DRIVE SHAFT 6-31

INITIAL SETUP

***Applicable Configurations:***
All

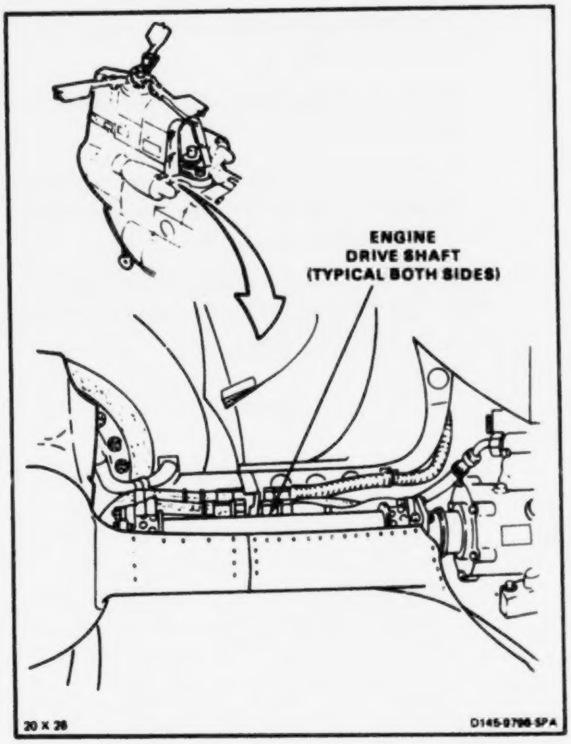
***Tools:***
Dial Indicating Depth Gage

***Materials:***
Cloths (E120)
Crocus Cloth (E122)
Zinc Chromate Primer (E291)
Gloves (E186)

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)



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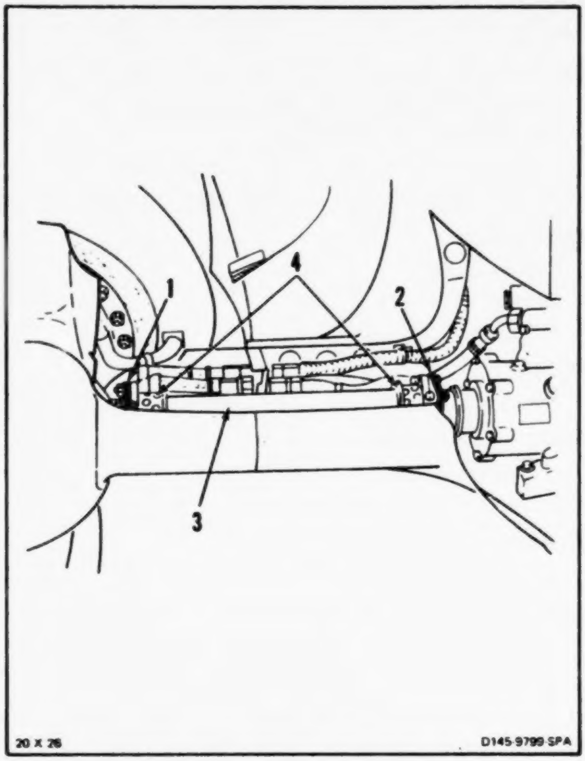
**NOTE**

Repair left or right engine drive shaft in same way. Right shaft shown.



1. **Remove light scratches, corrosion, and nicks from outside edge of plates (1 and 2).**
2. **Blend out nicks, scratches, and gouges on face of plates (1 and 2)** with crocus cloth (E122). **Do not go deeper than 0.010 inch.**
3. **Blend out scratches, nicks, and gouges on tube (3)** with crocus cloth (E122). **Do not go deeper than 0.010 inch.** Keep a blend radius of at least 1/2 inch.
4. No repair is permitted to adapters (4) at ends of tube (3).

*INSPECT*

**WARNING**

**Zinc chromate primer is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

5. Touch up tube (3) as needed with two coats of zinc chromate primer (E291). Wear gloves (E186).

FOLLOW-ON MAINTENANCE:

Close engine transmission fairing access cover (Task 2-2).

Install engine air inlet screens (Task 4-79).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).

**END OF TASK**

## 6-32 INSTALL ENGINE DRIVE SHAFT

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Torque Wrench, 30 to 150 Inch-Pounds

Torque Wrench, 100 to 750 Inch-Pounds

***Materials:***

Cloths (E120)

Grease (E190)

Oil (E254)

***Parts:***

Packing

***Personnel Required:***

Medium Helicopter Repairer

Inspector

***References:***

TM 55-1520-240-23P

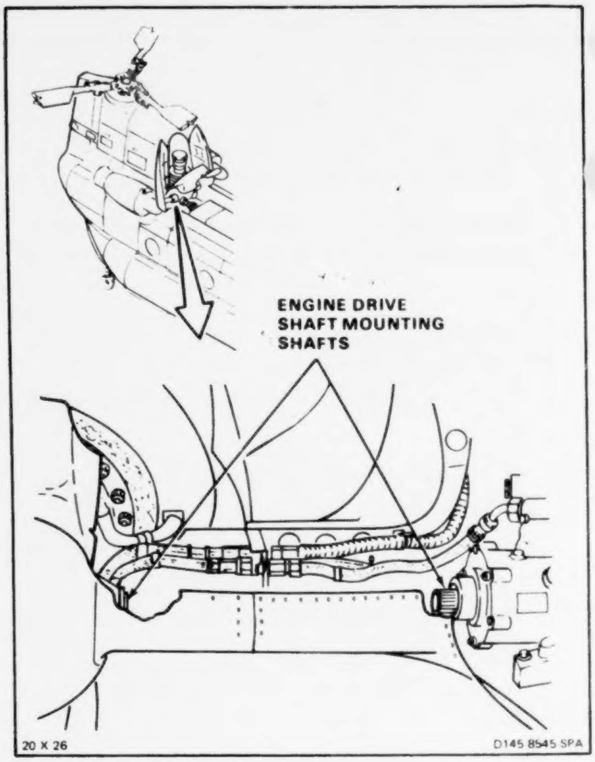
***General Safety Instructions:***

**WARNING**

**Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

**Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**



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## 6-32 INSTALL ENGINE DRIVE SHAFT (Continued) 6-32

**NOTE**

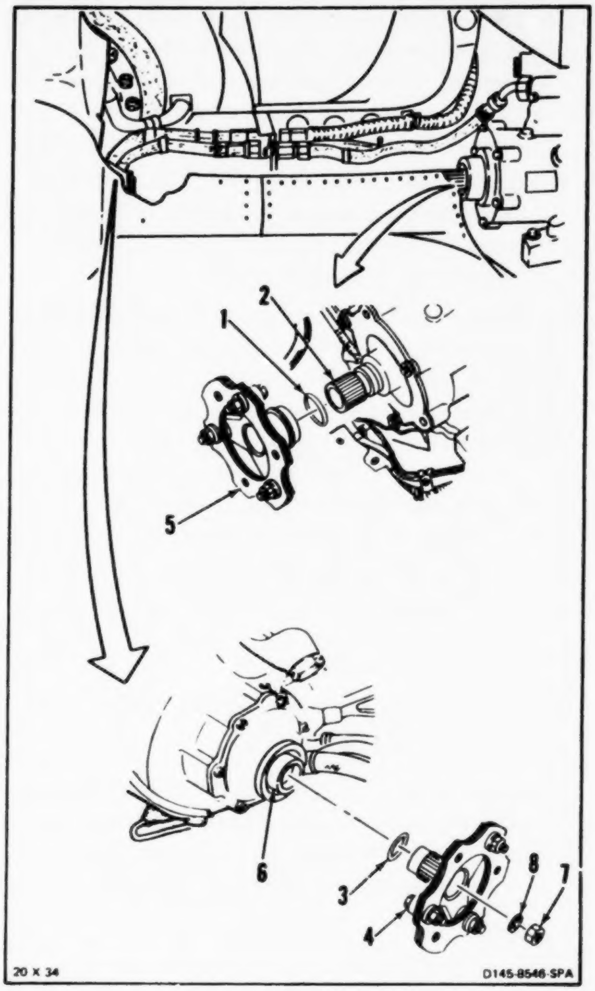
Install left or right engine drive shaft in same way. Right shaft shown here.

### *INSTALL ADAPTER ASSEMBLIES*

**NOTE**

Shaft and adapter assemblies are balanced together and have the same serial number. If any one is installed, all three must be installed as a unit.

1. Coat packing (1) with grease (E190). **Install packing on** combining transmission **input shaft (2).**
2. Coat packing (3) with grease (E190). **Install packing on adapter assembly (4).**
3. Clean splines of adapter assemblies (4 and 5), combining transmission input shaft (2), and engine transmission output shaft (6). **Pack all splines with grease (E190).**
4. **Install adapter assembly (5)** on combining transmission input shaft (2). Wipe off excess grease with cloths (E120).
5. **Install adapter assembly (4)** on engine transmission output shaft (6). Wipe off excess grease with cloths (E120).
6. Coat thread of nut (7) with grease (E190). **Install washer (8) and nut** in adapter assembly (4). **Torque nut to 120 inch-pounds.**

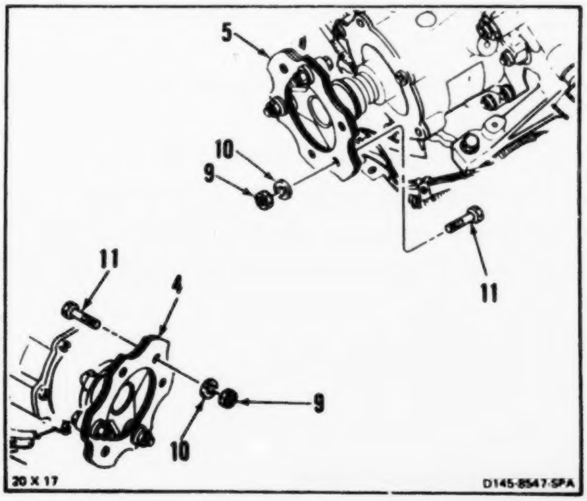


### *INSTALL SHAFT*

**CAUTION**

**Do not allow bolt to turn. If bolt turns, bolt and adapter assembly can be damaged.**

7. **Remove one nut (9), washer (10) and bolt (11)** from each of two adapter assemblies (4 and 5). During removal, hold head of bolt with wrench.



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## 6-32 INSTALL ENGINE DRIVE SHAFT (Continued) 6-32

8. Position shaft (12) between adapter assemblies (4 and 5) so that leg of shaft marked 2 is between legs of adapter assembly (4) marked 1 and 3 and leg of shaft marked 5 is between legs of adapter assembly (5) marked 4 and 6.
9. Coat thread of six bolts (13) with oil (E254). **Install three bolts, washers (14) and nuts (15)** at each end of shaft (12). Bolt heads shall face each other.
10. Coat thread of two bolts (11) with oil (E254). Install one bolt, washer (10), and nut (9) in each adapter assembly (4 and 5). Bolt heads shall face away from each other.

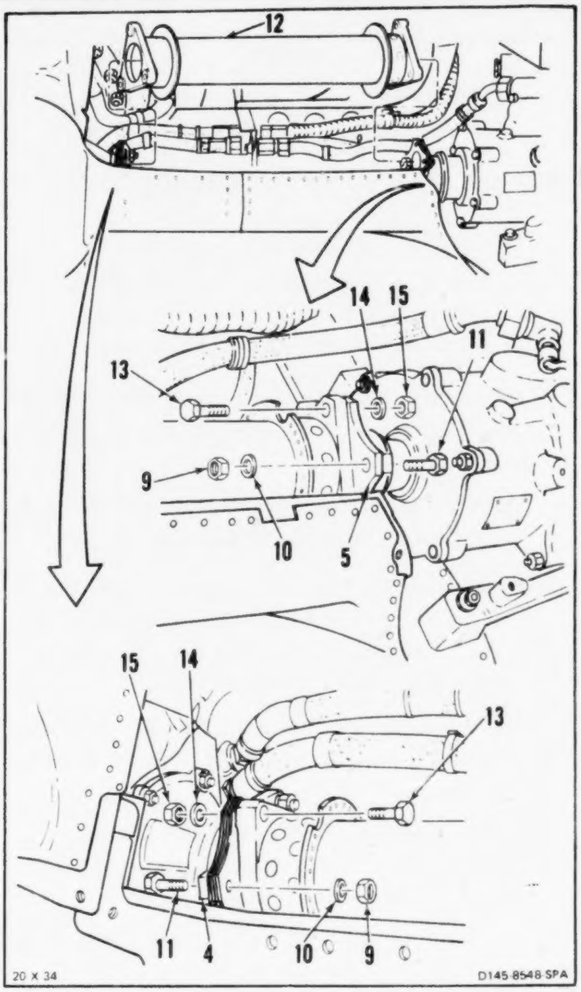
**CAUTION**

**Do not allow bolts to turn. If bolts turn, bolts, plates, or adapter assembly can be damaged.**

**NOTE**

If nuts do not meet friction torque, they must be replaced.

11. Hold head of bolts (11 and 13) with wrench. **Check nuts (9 and 15) for friction torque of at least 10 inch-pounds. Torque nuts to 440 inch-pounds.**



***INSPECT***

FOLLOW-ON MAINTENANCE:

Close engine transmission fairing access cover (Task 2-2).

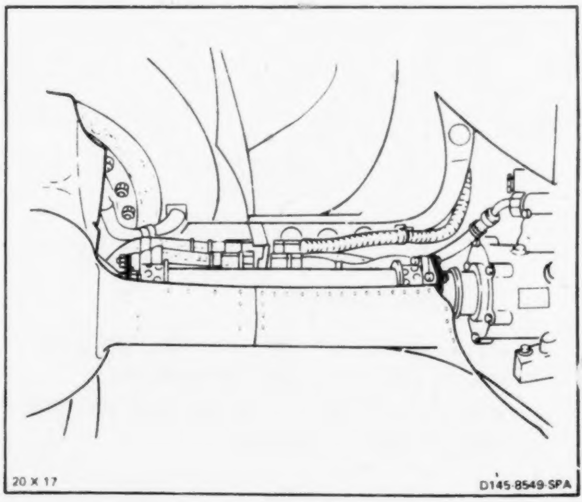
Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).

Install engine air inlet screen (Task 4-76).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

# SECTION III

# FORWARD ROTARY-WING DRIVE TRANSMISSION

## 6-33 REMOVE FORWARD TRANSMISSION SUMP 6-33

INITIAL SETUP

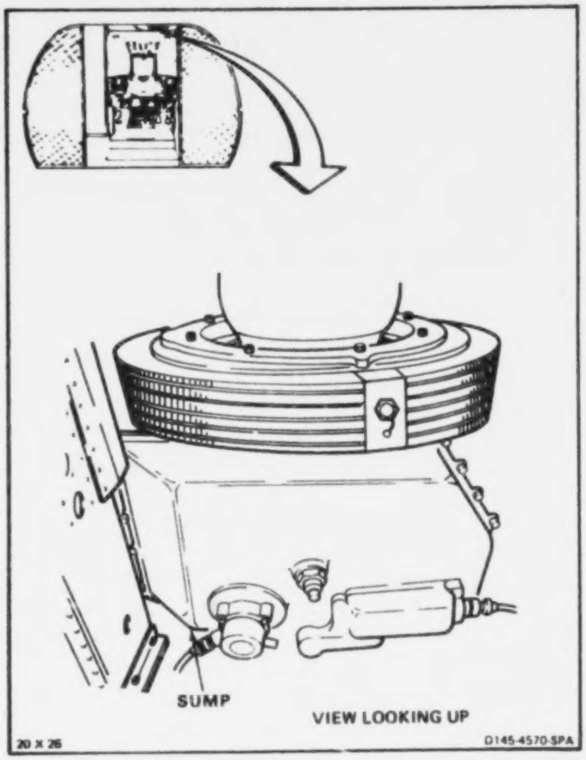
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 14-Quart (2)

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

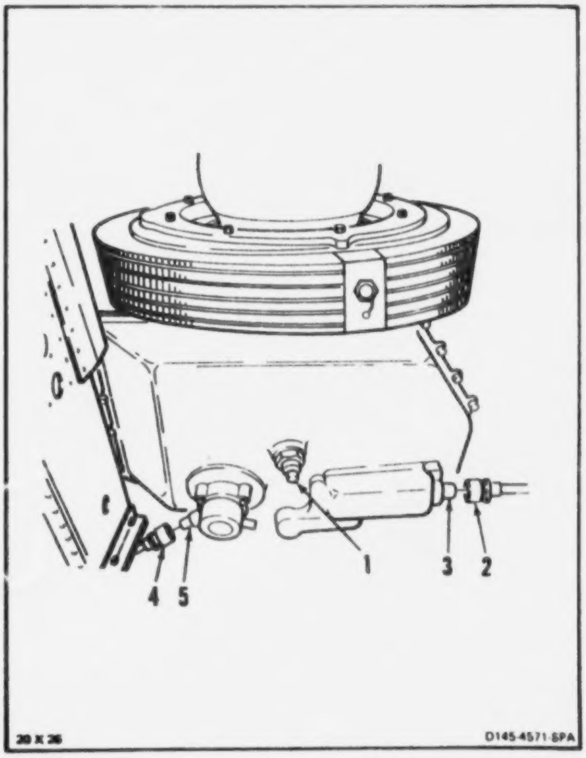
***Equipment Condition:***
Forward Transmission Drip Pan Removed (Task 2-3)



**NOTE**

Sump holds about 23 quarts of oil.

1. Push in drain valve (1), twist, and pull. **Let oil drain** into containers. Push in valve and twist it to close.
2. **Disconnect connector (2)** from temperature bulb receptacle (3). **Disconnect connector (4)** from chip detector receptacle (5).



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## 6-33 REMOVE FORWARD TRANSMISSION SUMP (Continued) 6-33

3. **Remove 23 nuts (6)** and washers (7). **Remove seven bolts (8)** and washers (7).

**CAUTION**

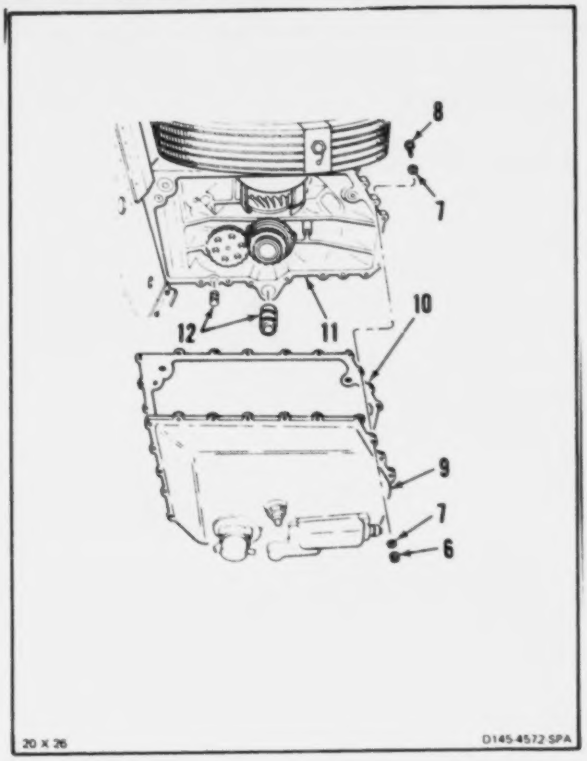
**Be careful not to damage gasket seal when lowering sump.**

4. **Lower and remove sump (9)** and gasket seal (10) from transmission (11).
5. **Remove gasket seal** from sump.

**NOTE**

Tubes may stay in sump or in transmission.

6. If two oil transfer tubes (12) are in transmission (10), remove them. Install tubes in sump (9).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-34 DISASSEMBLE FORWARD TRANSMISSION SUMP 6-34

INITIAL SETUP

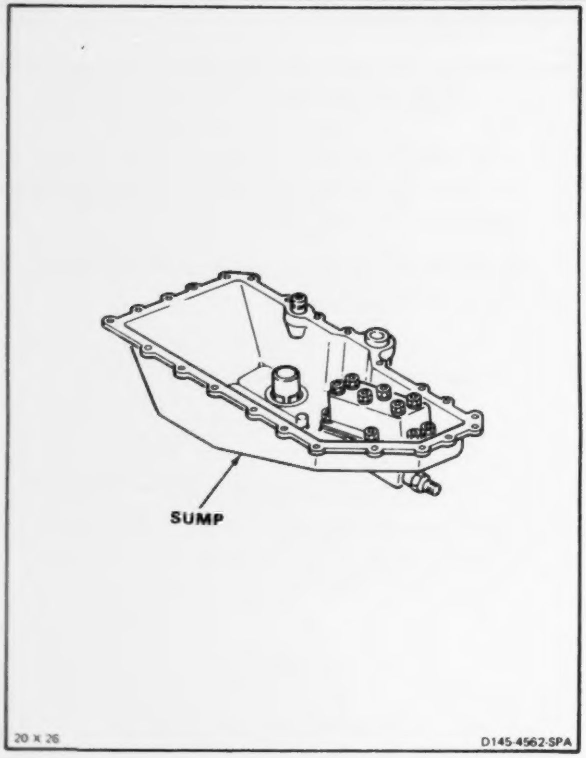
***Applicable Configurations:***
All

***Tools:***
Airframe Repairer's Tool Kit, NSN 5180-00-323-4876
Open End Wrench, 1 3/8-Inch

***Materials:***
None

***Personnel Required:***
Aircraft Structure Repairer

***Equipment Condition:***
Off Helicopter Task
Forward Transmission Sump Removed (Task 6-33)



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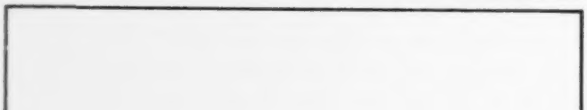
1. **Remove two oil transfer tubes (1)** and four packings (2).
2. Remove six nuts (3) and washers (4) from oil inlet screen (5). **Remove screen and gasket seal (6).**



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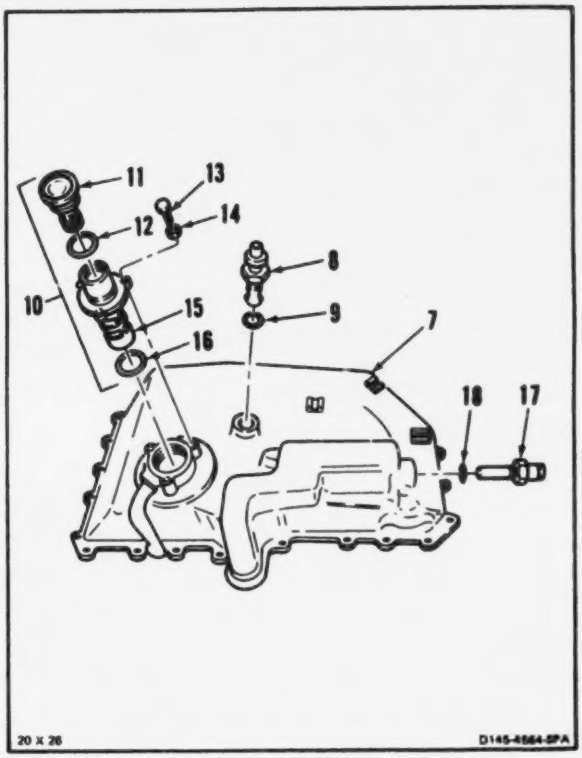
## 6-34 DISASSEMBLE FORWARD TRANSMISSION SUMP (Continued) 6-34



3. Turn sump (7) over 180 degrees. Remove lockwire from drain valve (8). **Remove drain valve** and packing (9).
4. **Remove detection screen and chip detector (10)** as follows:
   a. Push in cap (11), twist to left, and pull to **remove cap** and packing (12).
   b. Remove lockwire from three bolts (13). **Remove bolts** and washers (14). **Remove housing (15)** and packing (16).
5. Remove lockwire from temperature bulb (17). **Remove temperature bulb** and packing (18).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-35 REPAIR TRANSMISSION SUMP (AVIM) 6-35

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Airframe Repairer's Tool Kit, NSN 5180-00-323-4876
Shot Bags or Equivalent
Gram Scale, 100 Gram Capacity
Tee, 1/4-Inch
Source of Vacuum
Infrared Lamp, 140 to 160°F

***Materials:***

Abrasive Paper, 120 Grit (E7)
Abrasive Paper, 280 Grit (E10)
Kevlar Fabric, Style 285 or 281 (E209)
Wood Spatula (E424)
Polyethlene Cup (E157)
Brush (E86)
Teflon Tape (E399)
Epoxy Resin Adhesive (E47)
Hardener (E459)
Gloves (E186)
Acetone (E20)
Peel Ply (E270)
Primer (E292)
Epoxy Coating (E137)
Cloths (E120)
Teflon Impregnated Fabric (E170)
Temperature Indicating Strips (E413)

***Personnel Required:***

68G20 Aircraft Structure Repairer
68G30 Inspector

***Equipment Condition:***

Off Helicopter Task

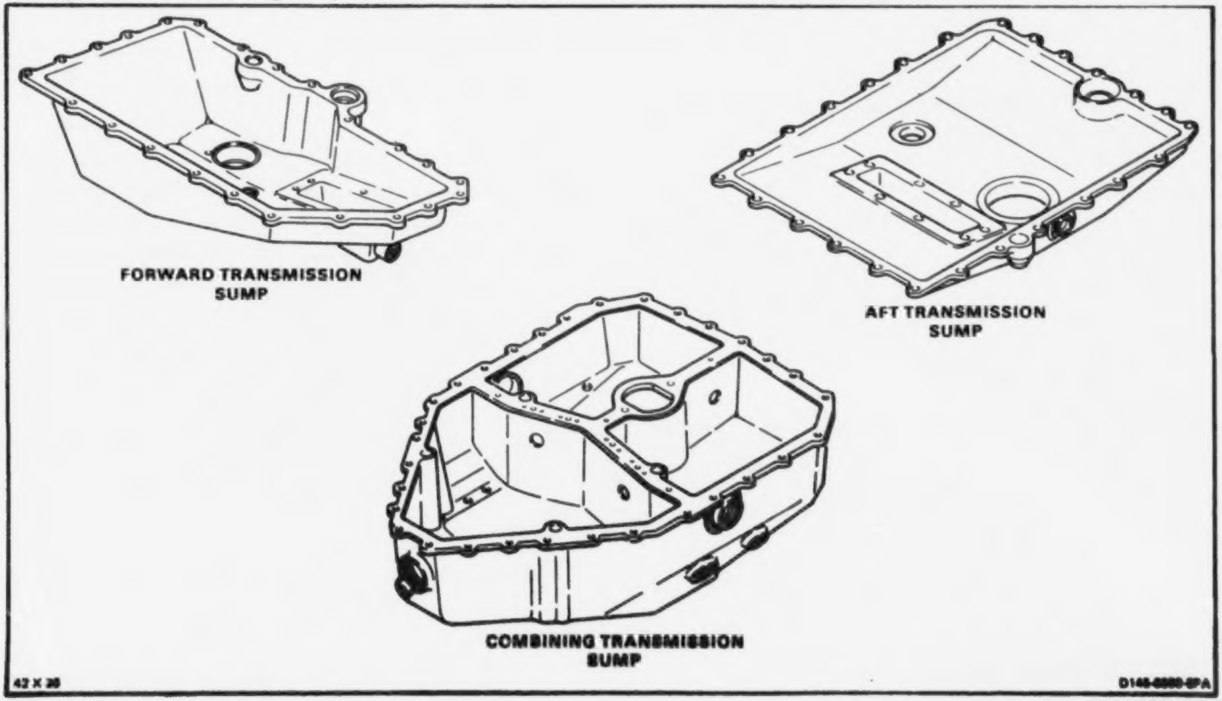
***General Safety Instructions:***

**WARNING**

**Acetone (E20) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy resin adhesive (E47) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



FORWARD TRANSMISSION SUMP

AFT TRANSMISSION SUMP

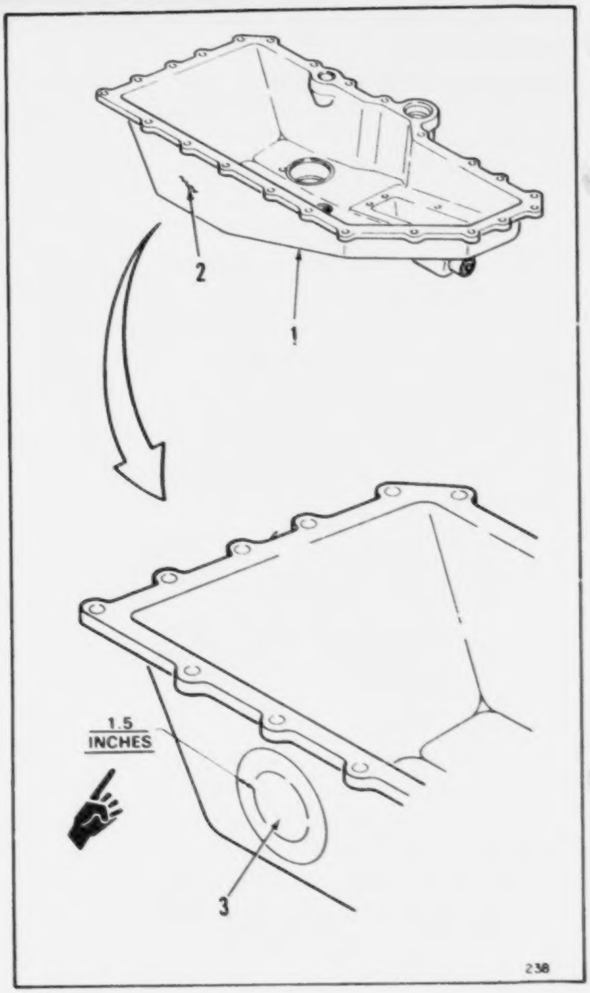
COMBINING TRANSMISSION SUMP

GO TO NEXT PAGE

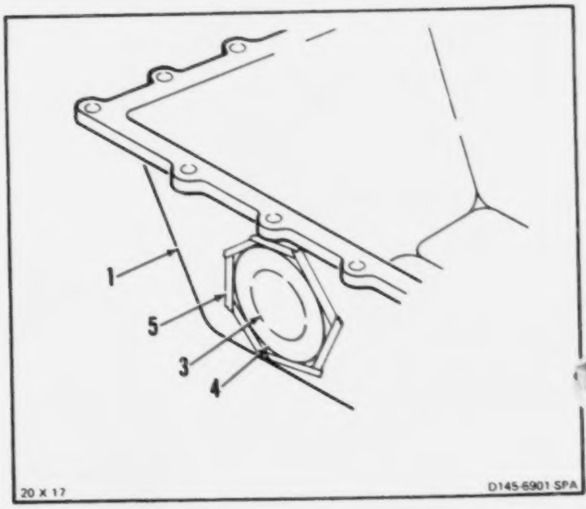
**NOTE**

Procedure is same to repair sump from forward, aft, or combining transmission. Typical repair of forward transmission sump shown here.

1. **Inspect sump (1)** for extent of damage. If damage is not through sump, go to step 2. If damage goes through sump, no repair is allowed.
2. Clean sump (1) for 3 inches beyond damage (2). Use acetone (E20) and cloths (E120). Wear gloves (E186).
3. **File or sand damage (2)** down to undamaged area with file or abrasive paper (E7). File or sand damaged area (3) to a round or oval shape. Taper depth of area to outside surface of sump (1).
4. **Clean sump (1)** for 1.5 inches beyond damaged area (3). Use acetone (E20) and cloths (E120). Wear gloves (E186).
5. **Measure depth of damaged area (3).** Record depth to nearest 0.01 inch. If depth is more than 0.090 inch, no repair is allowed.



6. Cover sump (1) around cleaned area (4) with Teflon tape (E399) (5).



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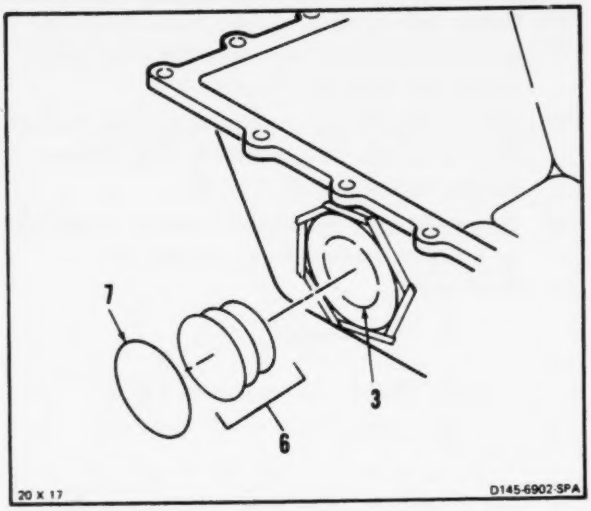
## 6-35 REPAIR TRANSMISSION SUMP (AVIM) (Continued) 6-35

7. **Cut one patch of Kevlar fabric (E209) (6) for each 0.01 inch** depth recorded in step 4. Cut to shape of damaged area (3). Cut pieces to overlap and match taper of shape. **Cut another piece (7) to extend beyond damaged area 1-inch** in all directions.
8. Place fabric patches (6) in damaged area (3). Trim to fit. Check that top piece (7) overlaps area 1-inch in all directions.
9. Remove pieces (6 and 7) from sump (1).



10. Measure 50 grams of resin (E47) and 6 grams of hardener (E459).

**CAUTION**

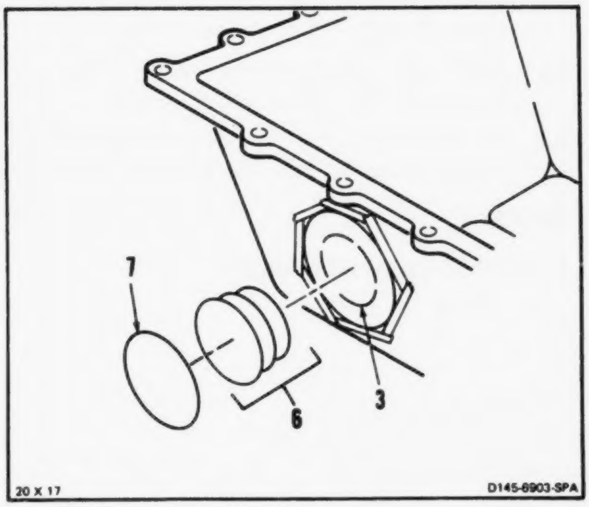
**Do not use styrofoam cup. Resin melts styrofoam.**

11. **Mix resin (E47) with hardener (E459).** Use polyethylene cup (E157) and wood spatula (E424). Wear gloves (E186).

**NOTE**

Working life of resin mixture is about 1 hour.

12. **Coat damaged area (3)** with resin mixture. Use brush (E86).
13. Beginning with smallest patch of fabric (6), **coat each patch with resin mixture and set it in damaged area (3).** Check that each patch overlaps patch below. Last patch (7) shall overlap repair area 1-inch in all directions.



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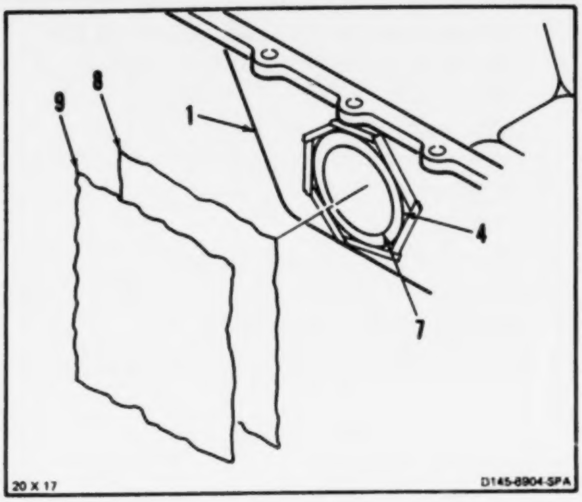
## 6-35 REPAIR TRANSMISSION SUMP (AVIM) (Continued) 6-35

14. Check that repair is slightly higher than surface of sump (1). Add more pieces of fabric under top patch (7), if needed.
15. **Cover repair** and cleaned area (4) with peel ply (E270) (8). Cover peel ply with Teflon-impregnated fabric (E170) (9).
16. **Place weight on repair area** to provide 2 to 3 psi pressure. Use shot bags or equivalent.

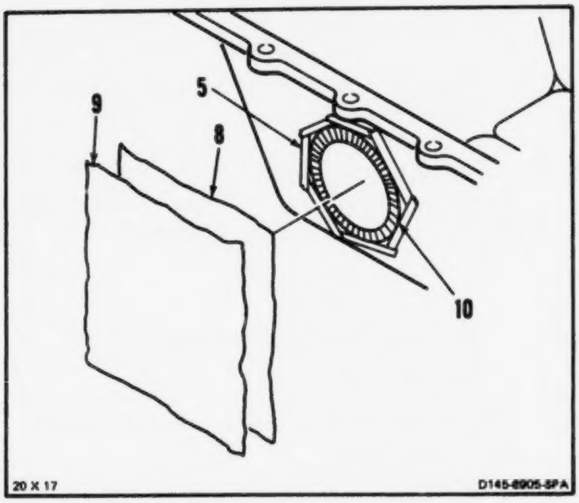
**CAUTION**

**If temperature exceeds 180°F (80°C) sump can be damaged.**

17. **Cure resin at 140 to 160°F (60° to 70°C) for 2 hours .** Use infrared lamp and temperature indicating strips (E413).



18. Remove weight, Teflon-impregnated fabric (9) and peel ply (8). Remove Teflon tape (5).
19. **Sand squeezeout (10)** until repair area is smooth. Use abrasive paper (E7).
20. Clean repair area with acetone (E20) and clean cloths (E120). Wear gloves (E186).
21. Sand repair area with abrasive paper (E10). Clean area with acetone (E20) and clean cloths (E120). Wear gloves (E186).
22. Apply one coat of primer (E292). Wear gloves (E186). Allow primer to dry.
23. Apply two coats of epoxy coating (E137). Wear gloves (E186). Allow coating to dry.



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-36 ASSEMBLE FORWARD TRANSMISSION SUMP 6-36

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Airframe Repairer's Tool Kit
NSN 5180-00-323-4876
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Deep Socket, 1 3/8-Inch
Source of Low-Pressure Compressed Air

***Materials:***

Lockwire (E231)
Dry Cleaning Solvent (E162)
Gloves (E186)
Cloths (E120)
Oil (E254)

***Parts:***

Packings

***Personnel Required:***

Aircraft Structure Repairer
Inspector

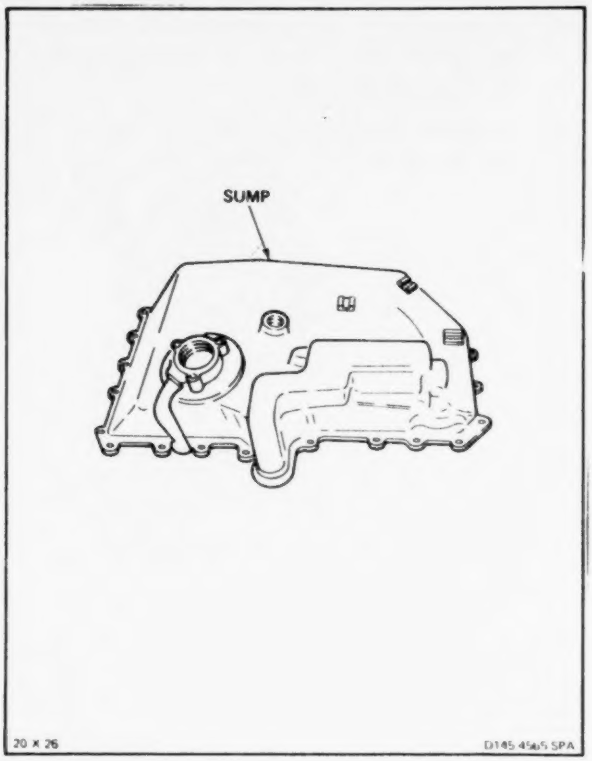
***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



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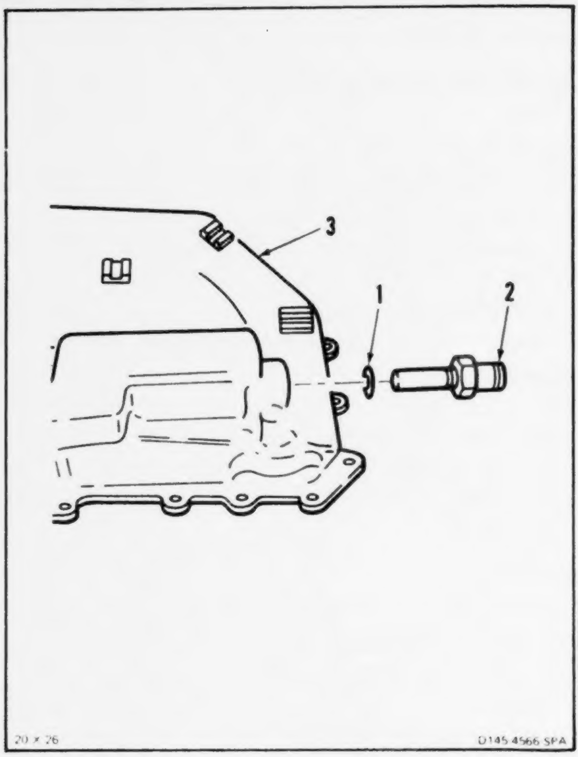
## 6-36 ASSEMBLE FORWARD TRANSMISSION SUMP (Continued) 6-36

1. Install packing (1) on temperature probe (2). **Install probe** in sump (3). **Torque probe to 75 inch-pounds.**
2. Lockwire probe (2) to sump (3). Use lockwire (E231).



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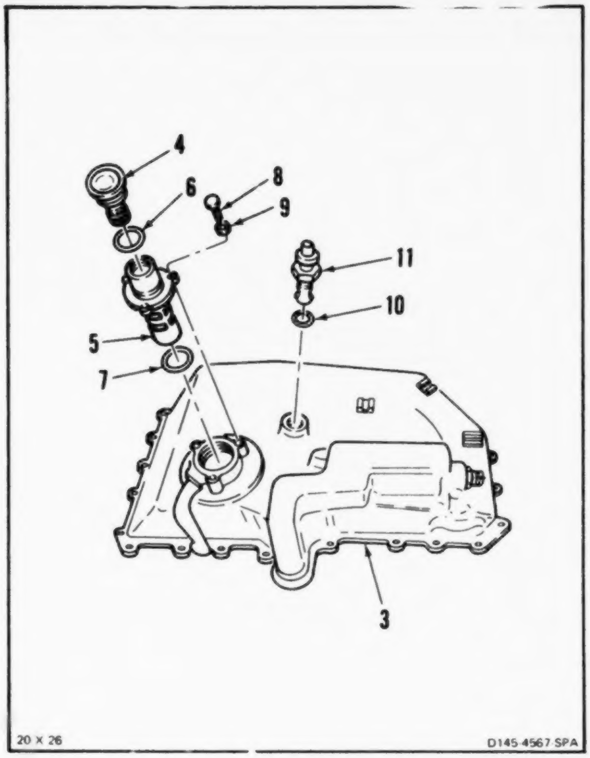
## 6-36 ASSEMBLE FORWARD TRANSMISSION SUMP (Continued) 6-36



3. If cap (4) and housing (5) are joined, push cap into housing, twist, and pull to remove cap from housing. Remove packing (6) from cap.

**NOTE**

If cap and housing are new, cleaning is not needed.

4. **Clean cap (4) and housing (5)** with solvent (E162) and clean cloths (E120). Wear gloves (E186).
5. Install packing (7) on housing (5). **Install housing (5)** in sump (3). Install three bolts (8) and washers (9). **Torque bolts to 60 inch-pounds.**
6. Lockwire three bolts (8) together. Use lockwire (E231).
7. Install packing (6) on cap (4).
8. Press center of cap (4) in and **install cap and packing (6) in housing (5).** Push in cap until center snaps out flush with outside of housing.

**WARNING**

**Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

**Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**

9. Coat packing (10) and thread of drain valve (11) with oil (E254). Install packing on valve. **Install valve sump (3). Torque valve to 75 inch-pounds.**
10. Lockwire drain valve (11) to sump (3) with lockwire (E231).
11. Turn sump (3) over 180 degrees.

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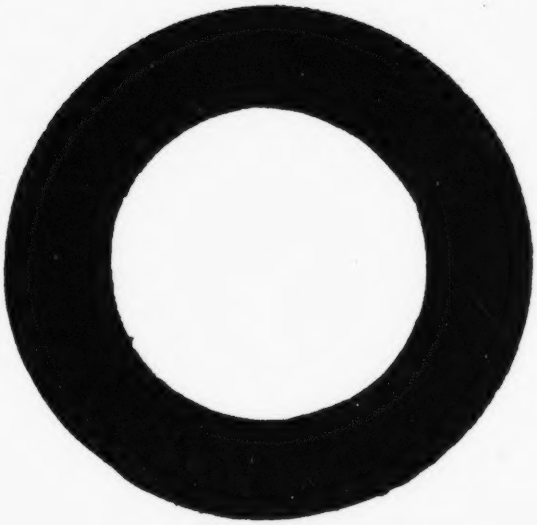


## 6-36 ASSEMBLE FORWARD TRANSMISSION SUMP (Continued) 6-36

**NOTE**

If screen is new, cleaning is not needed.

12. Clean inlet screen (13) as follows:

    a. Remove six nuts (14) and washers (15). Remove cap (16).

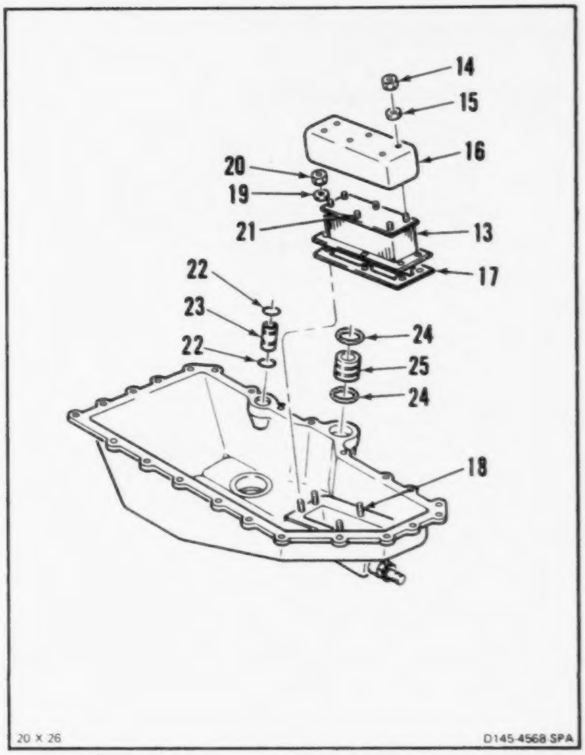
    b. Clean inlet screen (13) with solvent (E162) and clean cloths (E120). Dry screen with compressed air. Wear goggles.

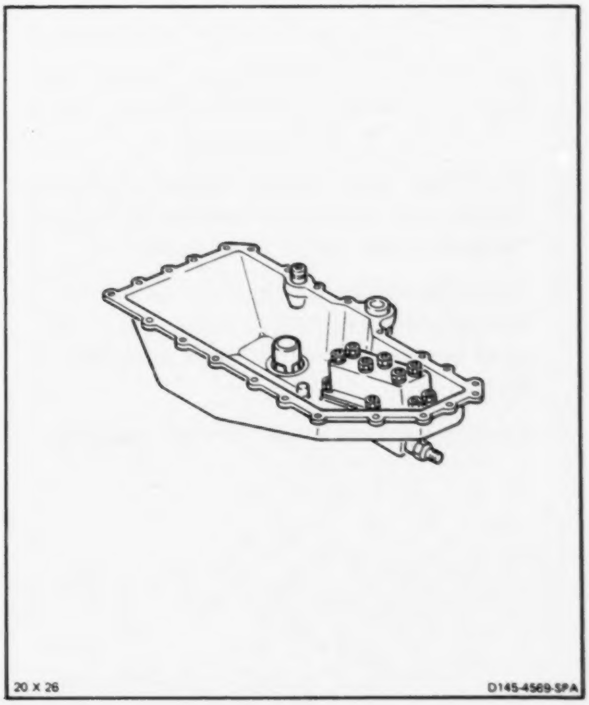
13. **Install gasket seal (17) and inlet screen (13)** on six studs (18). Install six washers (19) and nuts (20). **Torque nuts to 20 inch-pounds.**

14. If cap (16) was removed, **install cap** on six studs (21). Install six washers (15) and nuts (14). **Torque nuts to 20 inch-pounds.**

15. **Install** two packings (22) on **transfer tube (23).** Install **transfer tube.**

16. **Install** two packings (24) on **transfer tube (25).** Install **transfer tube.**





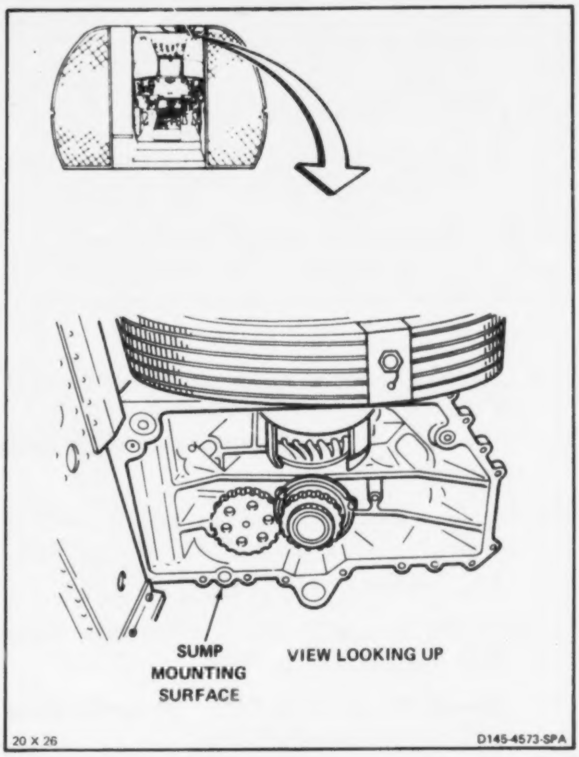
*INSPECT*

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-37 INSTALL FORWARD TRANSMISSION SUMP 6-37


SUMP MOUNTING SURFACE
VIEW LOOKING UP
20 X 26
D145-4573-SPA

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

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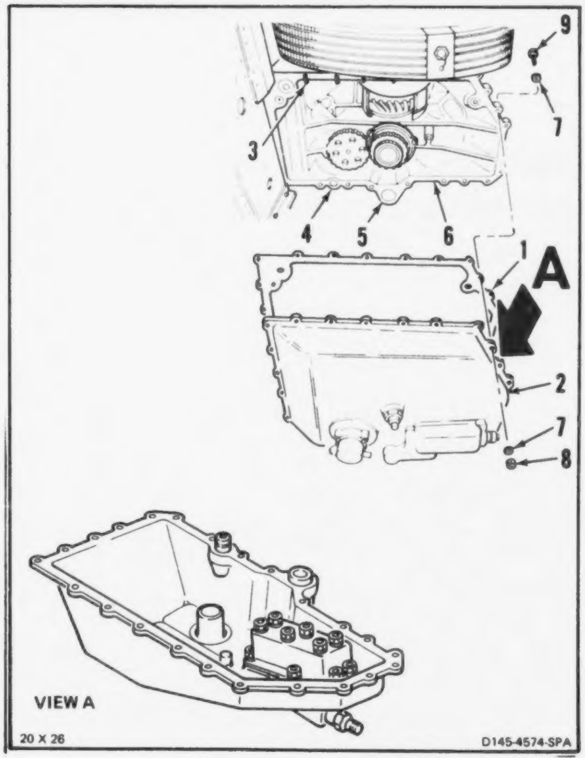
9
7
3
4
5
6
1
A
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7
8
VIEW A
20 X 26
D145-4574-SPA

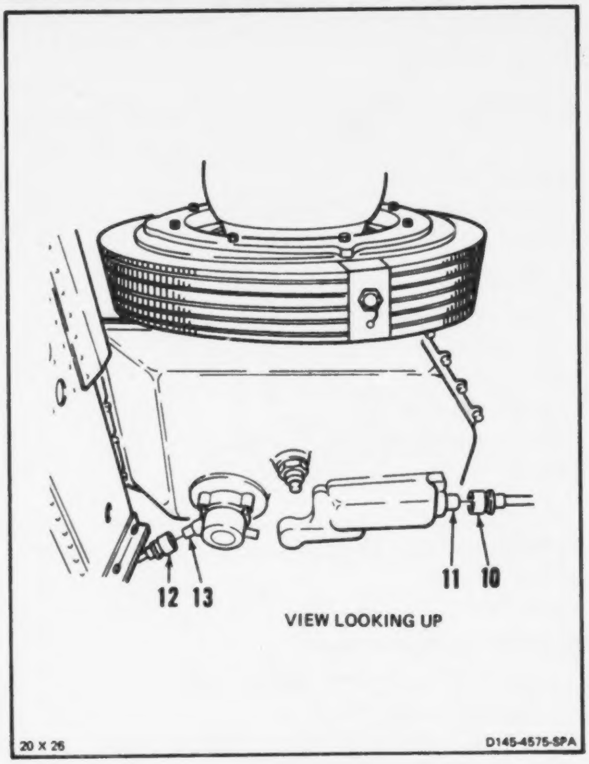
1. Position gasket seal (1) on sump (2).
2. Align sump (2) and gasket seal (1) with 16 studs (3) and two transfer tube ports (4 and 5).
3. **Position sump and seal against transmission (6). Install 16 washers (7) and nuts (8),** finger tight, on studs (3).
4. **Install seven bolts (9)** and washers (7) through transmission (1) and sump (2). **Install seven washers (7) and nuts (8)** on bolts.
5. **Torque 23 nuts (8) to 60 inch-pounds.**

***GO TO NEXT PAGE***

## 6-37 INSTALL FORWARD TRANSMISSION SUMP (Continued) 6-37

6. **Connect connector (10)** to temperature bulb receptacle (11). **Connect connector (12)** to chip detector receptacle (13).

***INSPECT***


12
13
11
10
VIEW LOOKING UP
20 X 26
D145-4575-SPA

FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

Install forward transmission drip pan (Task 2-3).

**END OF TASK**

## 6-37.1 CLEAN AND INSPECT FORWARD TRANSMISSION OIL FILLER SCREEN 6-37.1

INITIAL SETUP

***Applicable Configurations:***
All

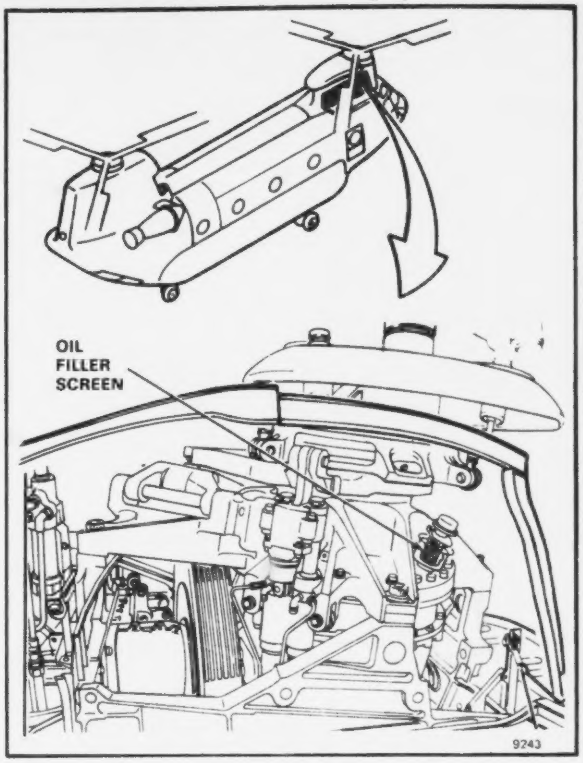
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
Task 6-108
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Right Work Platform Open (Task 2-2)



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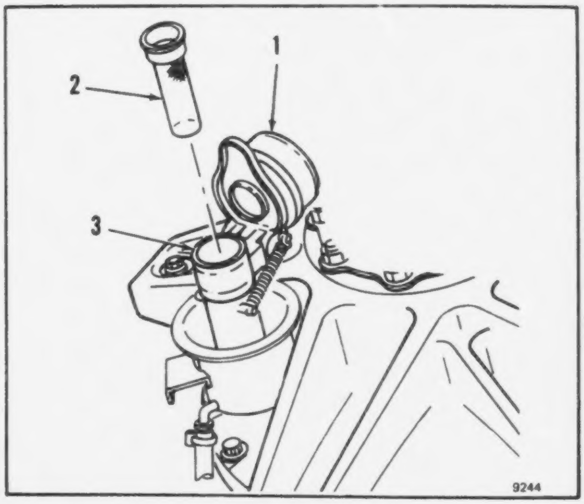
**CAUTION**

**Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.**

1. Open cap assembly (1). **Remove screen (2)** from neck of filler.
2. Close cap assembly (1).



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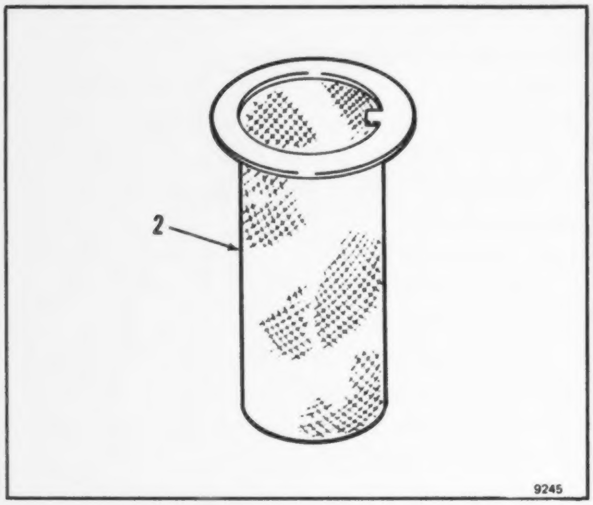
## 6-37.1 CLEAN AND INSPECT FORWARD TRANSMISSION OIL FILLER SCREEN (Continued) 6-37.1

3. **Check screen (2)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

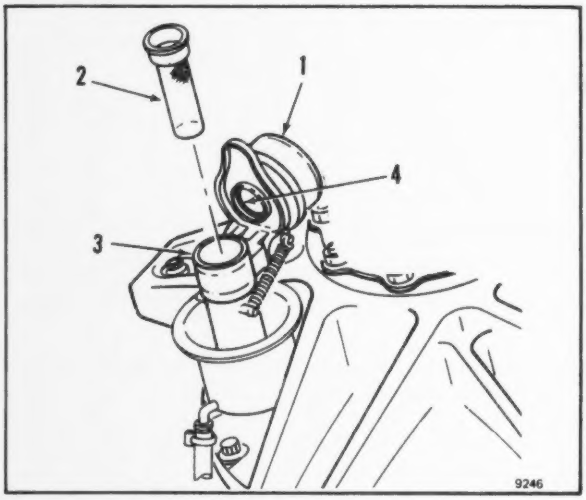
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. **Inspect screen (2)** for tears. There shall be no tears.



6. Open cap assembly (1). **Install screen (2)** in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.

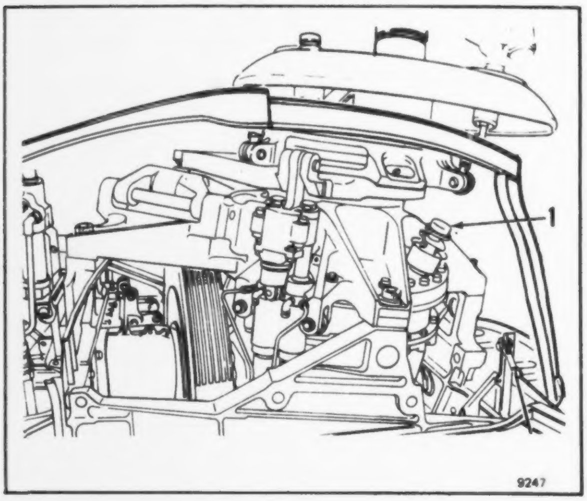


8. Close cap assembly (1).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close aft pylon doors (Task 2-2).



**END OF TASK**

## 6-37.2 REMOVE FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.2

INITIAL SETUP

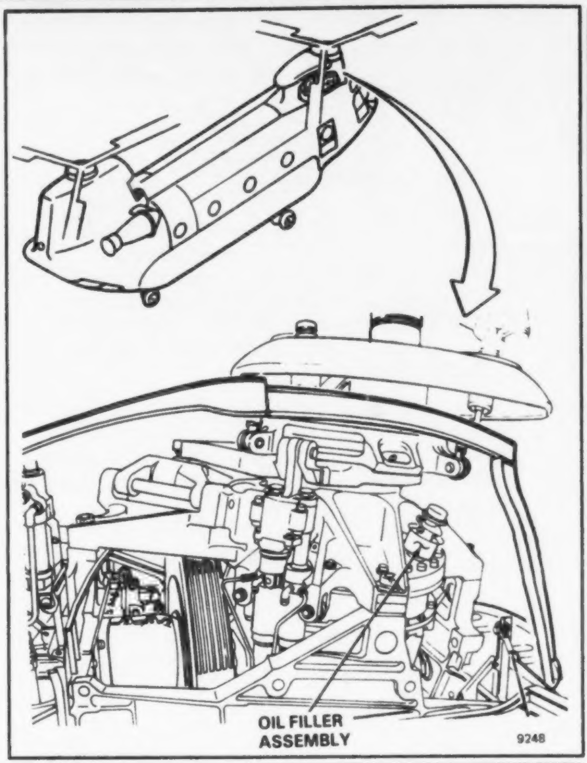
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

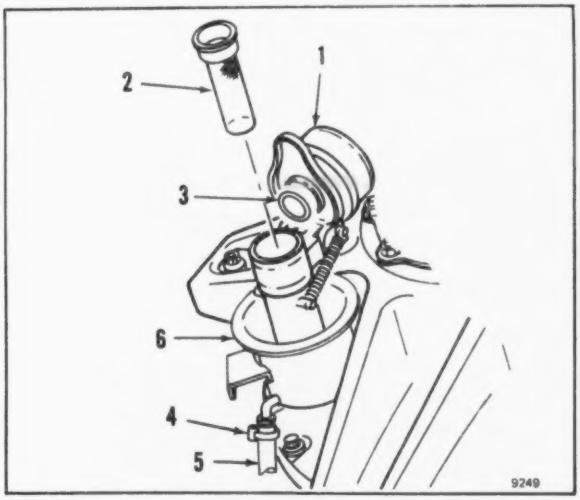
***Materials:***
Barrier Material (E80)
Masking Tape (E380)

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Right Work Platform Open (Task 2-2)



1. Open cap assembly (1). **Remove screen (2). Remove packing (3)** from underside of cap.
2. Loosen clamp (4). **Remove hose (5)** and clamp from cup (6).



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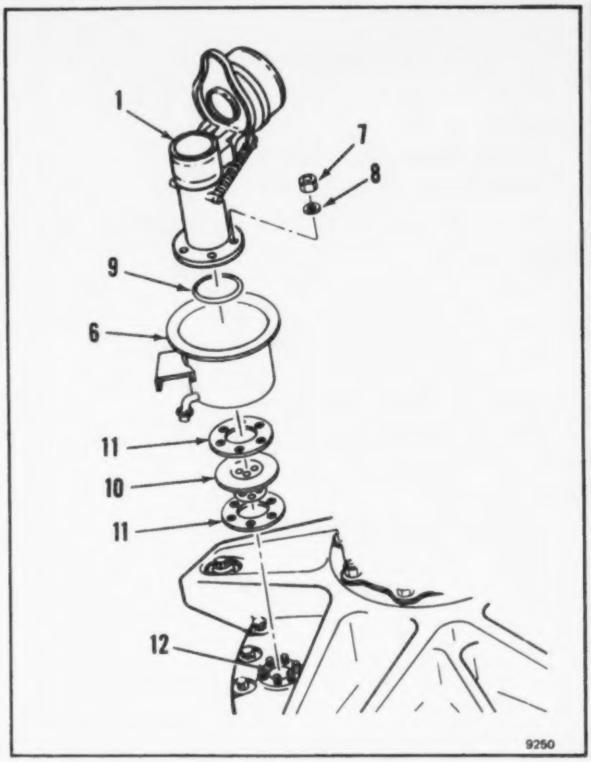
## 6-37.2 REMOVE FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.2 (Continued)

3. Remove six nuts (7) and washers (8) from inside cup (6). **Remove cap assembly (1)** and packing (9).
4. **Remove cup (6),** baffle (10), and two gaskets (11).
5. **Cover cavity (12)** with barrier material (E80) and masking tape (E380).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-37.3 INSTALL FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.3

INITIAL SETUP

***Applicable Configurations:***
All

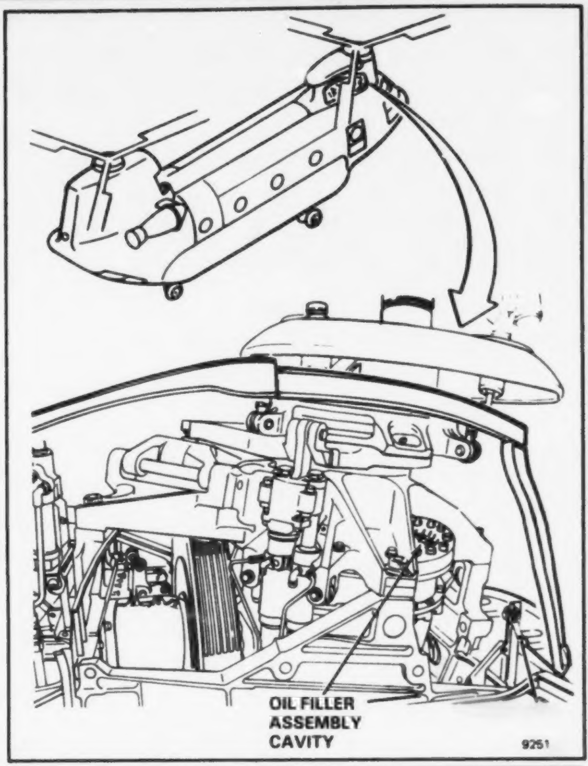
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds

***Materials:***
None

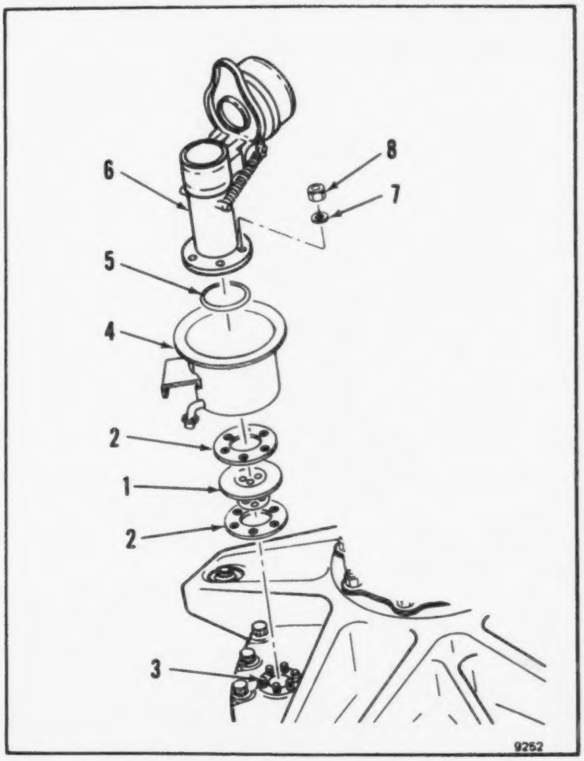
***Parts:***
Packing

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P



1. Place baffle (1), with flange up, between two gaskets (2). **Install baffle and gaskets on studs (3).**
2. **Install cup (4)** on studs (3).
3. **Install packing (5)** on bottom of cap assembly (6). **Install cap assembly,** with packing, on studs (3).
4. **Install six washers (7) and nuts (8)** on studs (3). **Torque nuts to 20 inch-pounds.**



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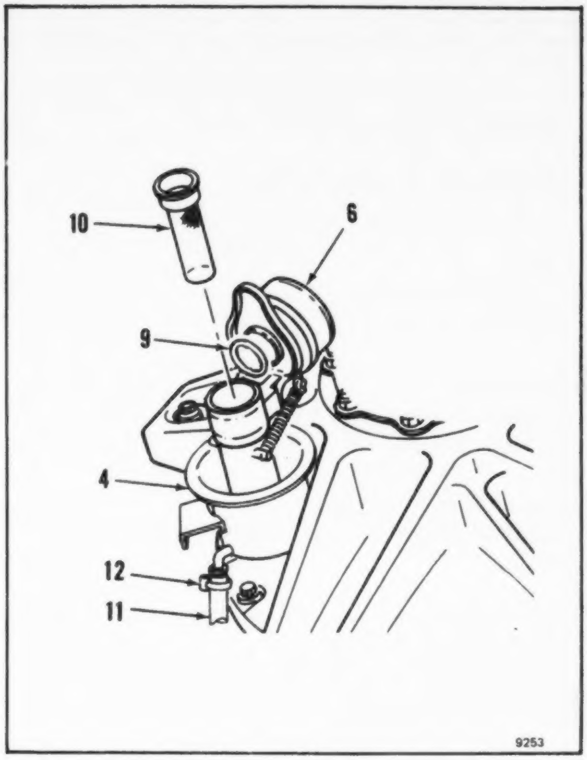
## 6-37.3 INSTALL FORWARD TRANSMISSION OIL FILLER ASSEMBLY 6-37.3 (Continued)

5. Open cap assembly (6). **Install packing (9)** on bottom of cap.
6. **Install screen (10)** in neck of cap assembly (6).
7. **Install hose (11)** on cup (4). Tighten clamp (12).

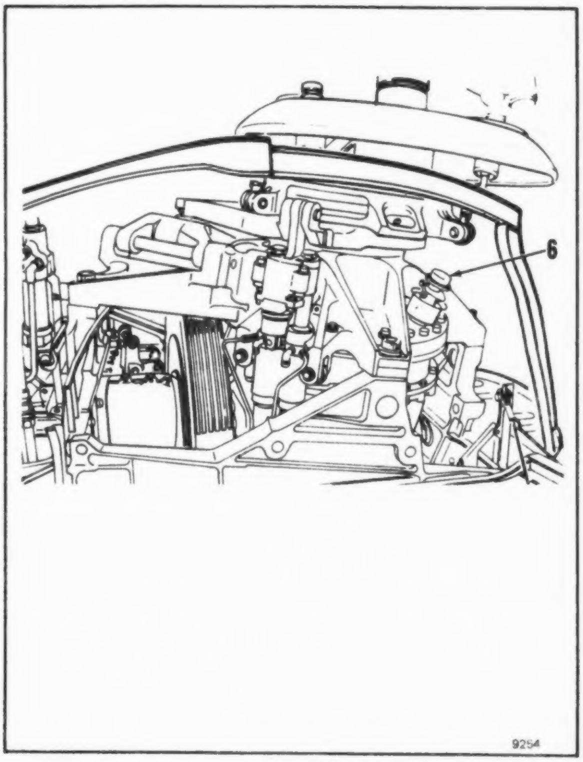


8. Close cap assembly (6).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close forward transmission right fairing (Task 2-2).



**END OF TASK**

## 6-38 REMOVE FORWARD TRANSMISSION SLIDER SHAFT 6-38

INITIAL SETUP

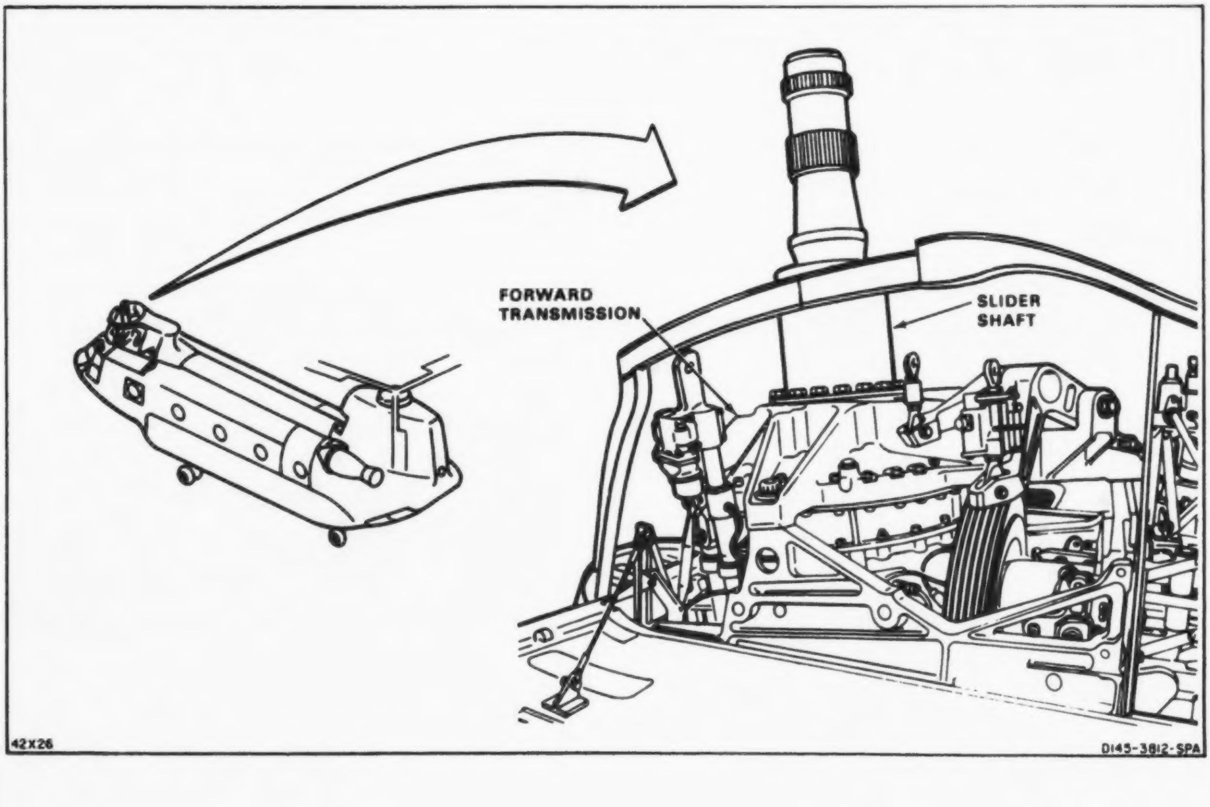
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Barrier Material (E81)
Tape (E388)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Rotary-Wing Blades Removed (Task 5-64)
Forward Rotary-Wing Head Removed (Task 5-8)
Forward Cover, Links, and Drive Arms Removed (Task 6-47)
Forward Swashplate Removed (Task 6-47)
Helicopter in Clean and Sheltered Area



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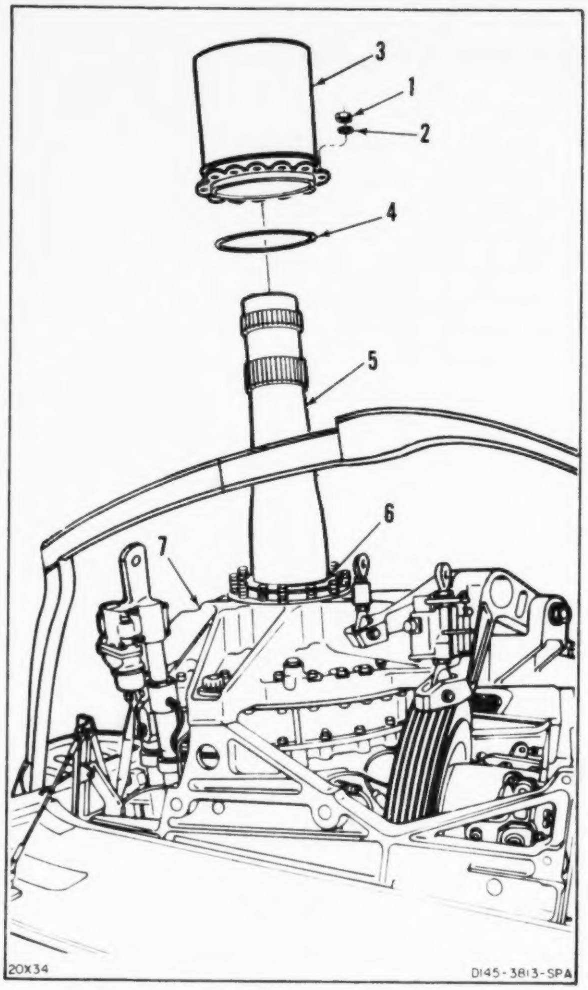
## 6-38 REMOVE FORWARD TRANSMISSION SLIDER SHAFT (Continued) 6-38



**CAUTION**

**Removing slider shaft exposes transmission parts to contamination. Do this task only in a clean, sheltered area. Otherwise, transmission can be damaged.**

1. **Remove 16 nuts (1)** and washers (2) from base of slider shaft (3).

**CAUTION**

**Do not scratch polished surface. Handle slider shaft carefully.**

**NOTE**

Packing may come off with shaft or stay with transmission.

2. **Lift slider shaft (3)** and packing (4) from shaft (5).
3. **Cover opening (6)** into transmission (7). Use barrier material (E81) and tape (E388).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-38.1 REPAIR FORWARD TRANSMISSION SLIDER SHAFT

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Gage 643J

***Materials:***
Naphtha (E245)
Emery Cloth (E123)
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Zinc Chromate Primer (E291)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer
68D30 Inspector

***References:***
TM 43-0103
MIL-C-5541

***Equipment Condition:***
Off Helicopter Task

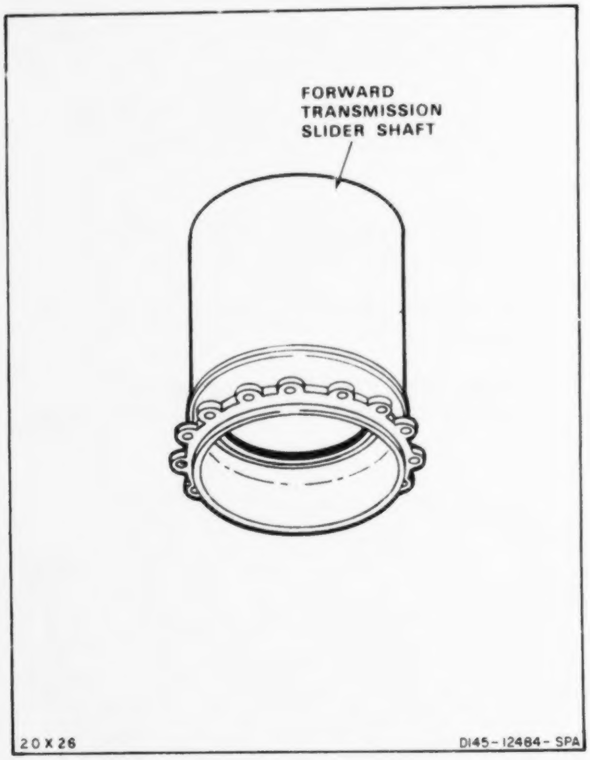
***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**



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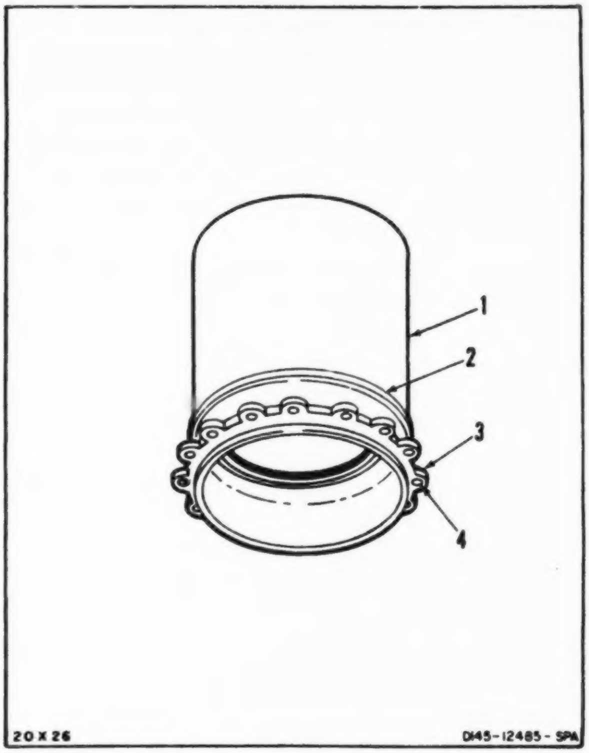
## 6-38.1 REPAIR FORWARD TRANSMISSION SLIDER SHAFT (Continued) 6-38.1

1. **Clean** oil and grease from **slider shaft (1).** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Inspect surface of slider shaft (1)** for nicks, scratches, and minor pitting or corrosion of coating. Observe the following definitions:
   a. Nick — A surface indentation with a sharp crease at the bottom. Surface finish is not broken. Caused by pressure or impact from a hard object with a sharp edge.
   b. Scratch — A light, narrow mark on the surface. Surface finish is broken, but not removed. Caused by a hard, sharp particle moving across the surface.
   c. Pit — A small irregular cavity where material is removed from the surface. Usually caused by corrosion. Pits are usually dark in appearance.
   d. Corrosion — A broken or pitted surface, discolored around the edge. Corrosion is caused by chemical action.
3. Note extent and location of damage:

**NOTE**

Limits in this step refer to depth of damage after rework.

   a. **Depth of damage above flange (2) (bearing surface) shall not be more than 0.020 inch. Depth of damage below flange shall not be more than 0.025 inch.**
   b. **Damage shall not extend from shaft surface to mounting flange (3).**
   c. **Damage on mounting flange (3) shall not be closer than 1.00 inch to any mounting hole (4).**



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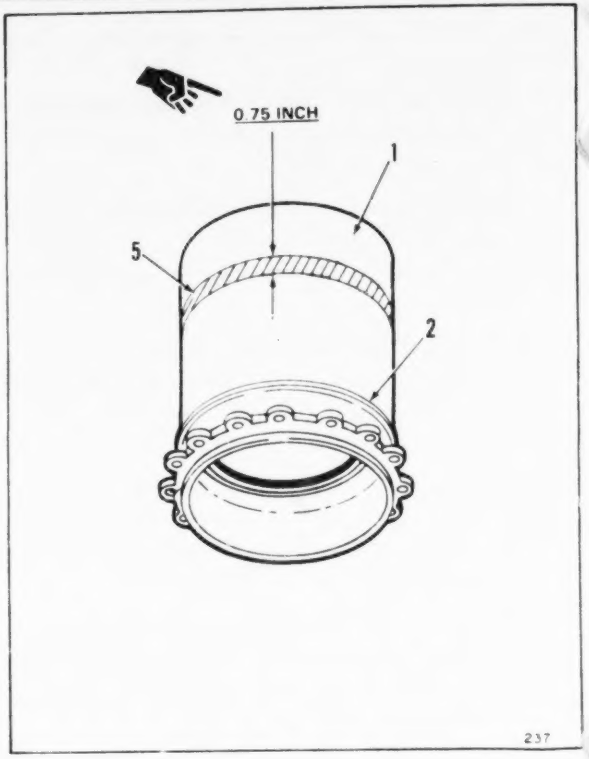
## 6-38.1 REPAIR FORWARD TRANSMISSION SLIDER SHAFT (Continued) 6-38.1



- d. **Sum of length plus width of any one damaged area shall not be more than 1.25 inches.**
- e. **Distance between two damaged areas shall not be less than half the length of the larger area.**
- f. **In that part of shaft (1) above flange (2), there shall be no more than 20 damaged areas in any 0.75 inch wide band (5) around shaft (1). There shall be no more than five damaged areas in any quarter-section of the band. The total of length plus width of all five areas shall not be more than 5.5 inches.**
- g. **There shall be no more than 75 damaged areas over entire shaft (1).**

4. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) There shall be no cracks.
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 3.
6. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid-etch reworked area** as follows:

**WARNING**

**Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

- a. **Prepare solution of 3 parts acetic acid (E21) to 7 parts water.** Wear gloves (E186) and goggles.
- b. **Swab area with solution for 2 minutes.** Use gauze sponges (E184).
- c. **Rinse** area with cold water.

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## 6-38.1 REPAIR FORWARD TRANSMISSION SLIDER SHAFT (Continued) 6-38.1

8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). There shall be no cracks.
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths (E120). Let area air dry.

**WARNING**

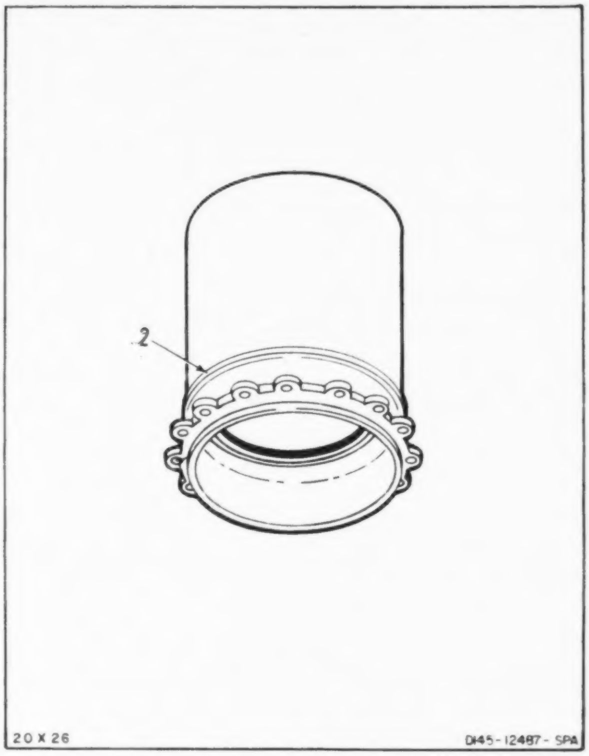
**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

   b. **Swab solution of alodine powder (E65) in water on area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184).
   c. **Rinse** area with cold water. Let air dry.

**WARNING**

**Zinc chromate primer (E291) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

   d. If reworked area is below flange (2), apply zinc chromate primer (E291). Wear gloves (E186).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-39 REMOVE FORWARD TRANSMISSION ROTOR SHAFT OIL SEAL

INITIAL SETUP

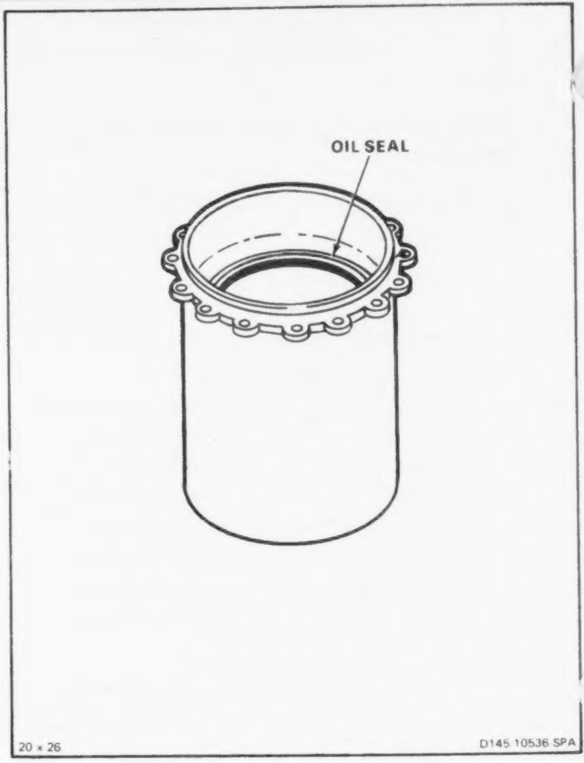
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

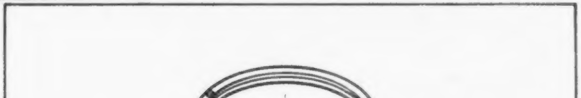
***Equipment Condition:***
Off Helicopter Task


OIL SEAL
20 x 26
D145-10536-SPA

1. **Remove retaining ring (1)** from inside slider shaft (2).
2. **Remove seal (3).**

FOLLOW-ON MAINTENANCE:

None


1
3
2
20 x 26
D145-10537-SPA

**END OF TASK**

## 6-40 INSTALL FORWARD TRANSMISSION ROTOR SHAFT OIL SEAL 6-40

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Aluminum Drift, 8 1/2-Inches OD, 1/4-Inch Thick Wall
Gun Heater
Pyrometer
Kevlar Gloves (E187)

***Materials:***

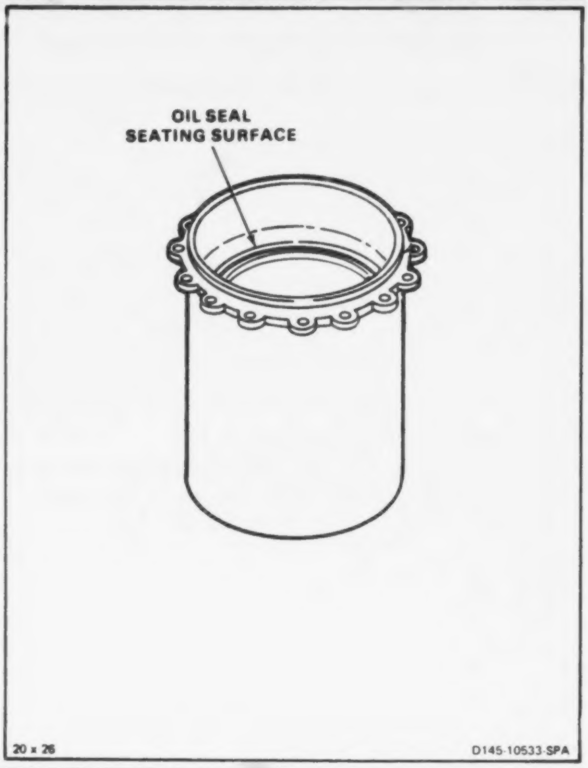
Acetone (E20)
Cloths (E120)
Gloves (E186)

***Personnel Required:***

Medium Helicopter Repairer
Inspector

***References:***

TM 55-1520-240-23P



**WARNING**

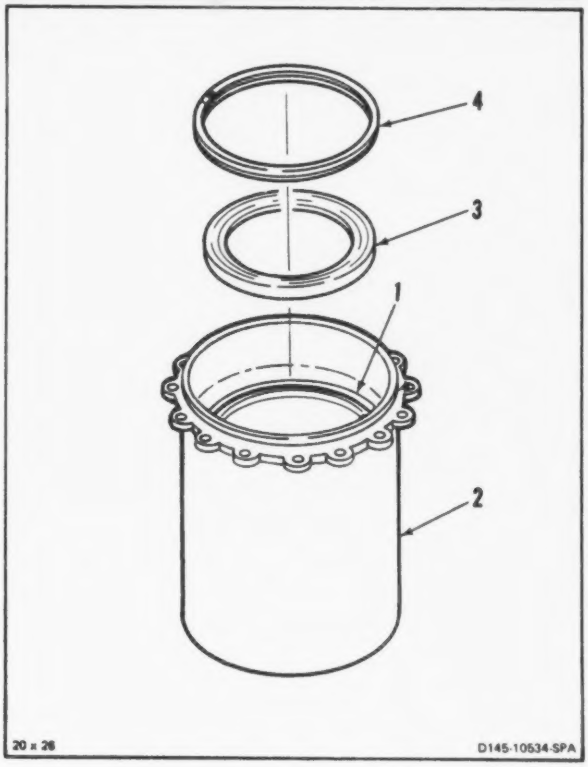
**Acetone (E20) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean seal seating surface (1) inside slider shaft (2). Use acetone (E20) and cloths (E120). Wear gloves (E186).

**WARNING**

**Wear Kevlar gloves when handling heated parts.**

2. Heat seal seating surface (1) to 230 to 250°F (110 to 120°C). Use a gun-type heater and a pyrometer. Wear Kevlar gloves (E187).
3. **Install seal (3)** in slider shaft (2), flat side down. Use drift.
4. **Install retaining ring (4).**



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## 6-40 INSTALL FORWARD TRANSMISSION ROTOR SHAFT OIL SEAL (Continued) 6-40

FOLLOW-ON MAINTENANCE:

None

20 x 26
D146-10535-8PA

**END OF TASK**

## 6-41 INSTALL FORWARD TRANSMISSION SLIDER SHAFT 6-41

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

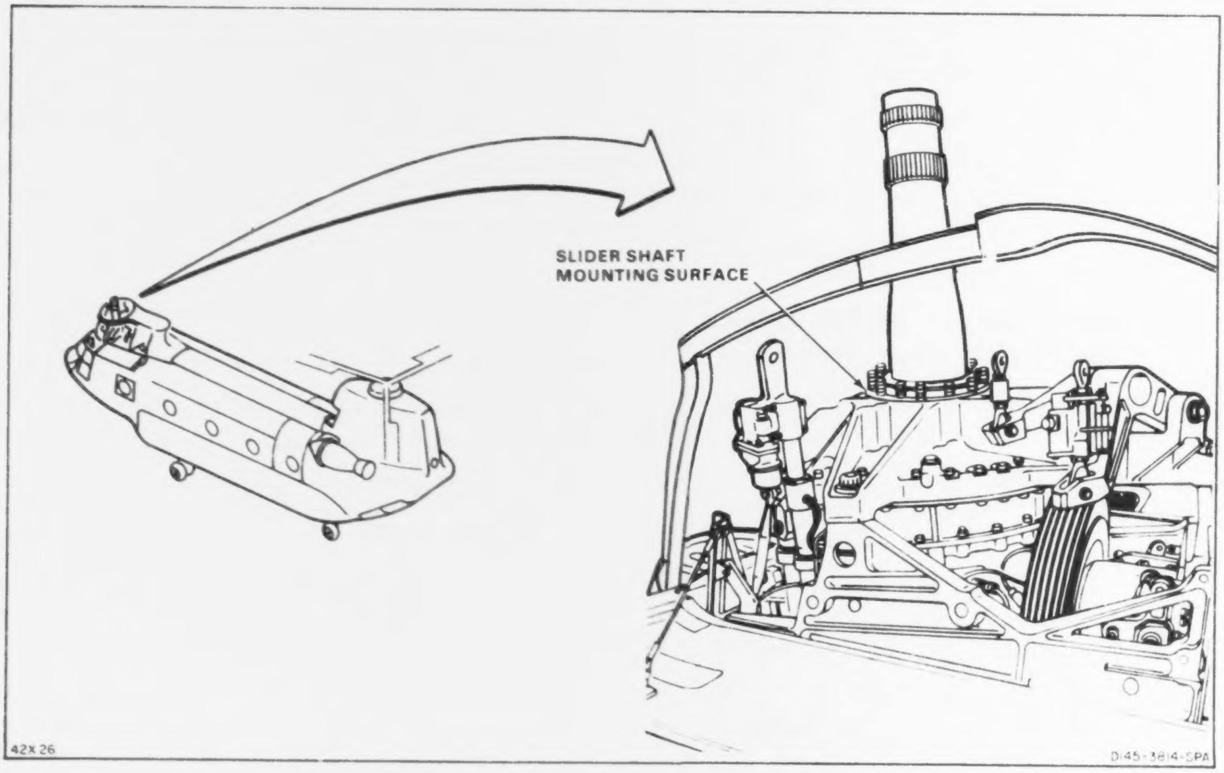
***Materials:***
Grease (E190)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Helicopter in Clean and Sheltered Work Area


SLIDER SHAFT MOUNTING SURFACE
42X26
D145-3814-SPA

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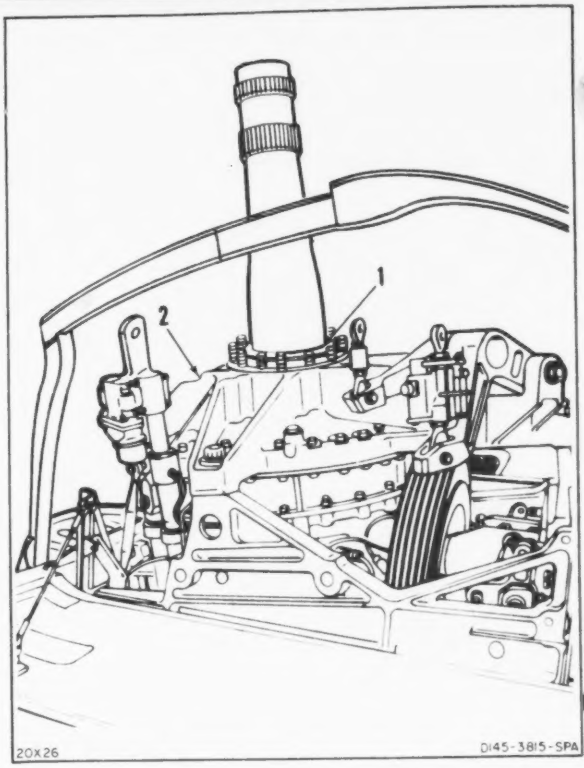
## 6-41 INSTALL FORWARD TRANSMISSION SLIDER SHAFT (Continued) 6-41

**CAUTION**

**Installing a slider shaft exposes transmission parts to contamination. Do this task only in a clean, sheltered area. Otherwise, transmission can be damaged.**

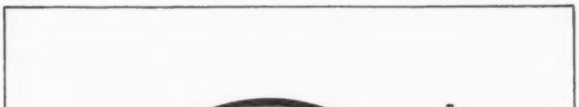
1. Remove barrier material from opening (1) in transmission (2).



**CAUTION**

**Do not scratch polished surface. Handle slider shaft carefully.**

2. Pack grease (E190) between lips of seal (3) on inside of slider shaft (4).
3. Install packing (5) around flange (6).



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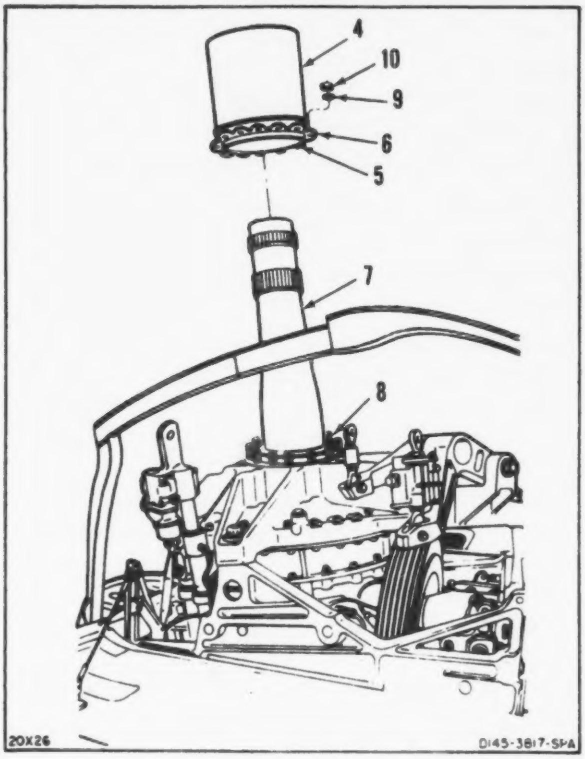
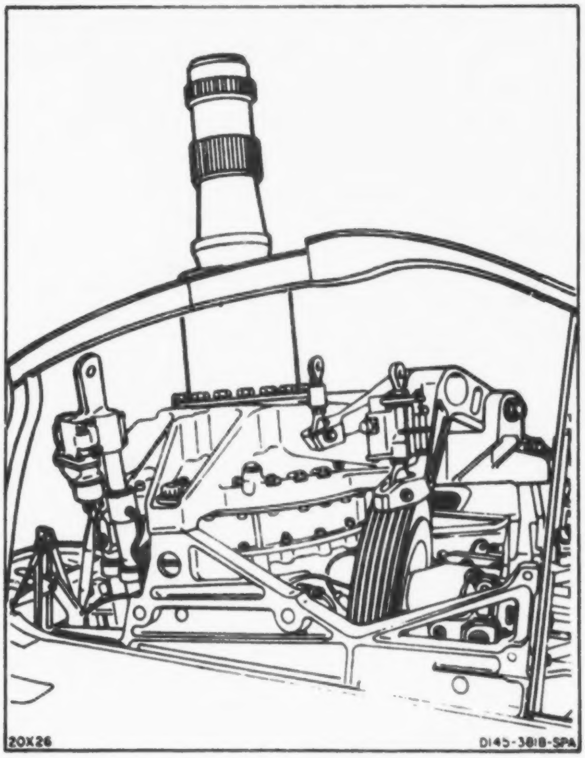
## 6-41 INSTALL FORWARD TRANSMISSION SLIDER SHAFT (Continued) 6-41

4. **Lower slider shaft (4),** flange (6) down over rotor shaft (7). Position slider shaft on 16 studs (8). Make sure packing (5) stays on flange.
5. **Install 16** washers (9) and **nuts (10). Torque nuts to 60 inch-pounds.**



***INSPECT***



FOLLOW-ON MAINTENANCE:

Install forward swashplate (Task 6-50).

Install forward cover, links, and drive arms (Task 6-50).

Install forward rotary-wing head (Task 5-9).

Install forward rotary-wing blades (Task 5-84).

**END OF TASK**

## 6-42 REMOVE FORWARD TRANSMISSION INPUT SHAFT SEAL 6-42

INITIAL SETUP

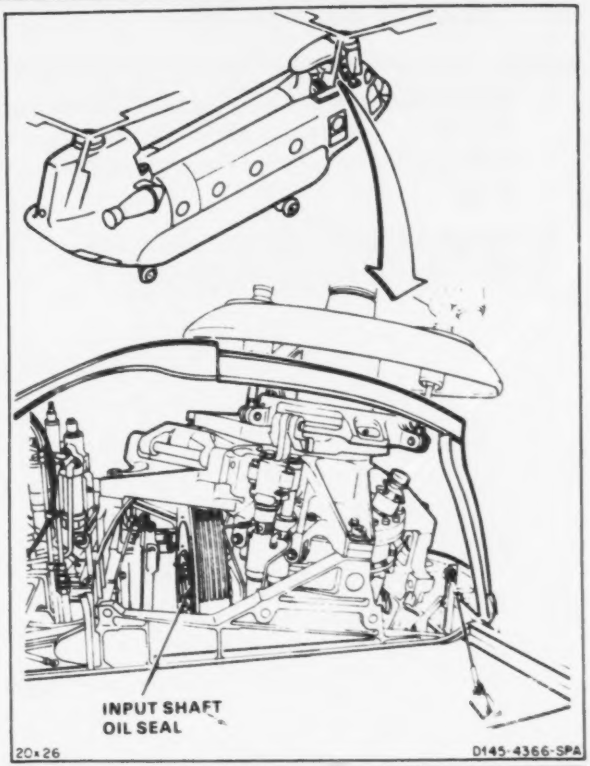
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
1/4-28 Bolt, At Least One Inch Long (3)

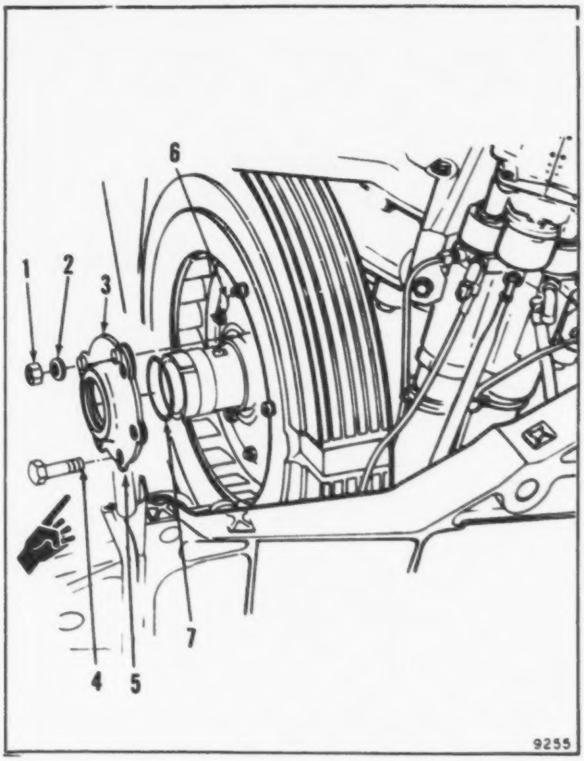
***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Opened (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)
Oil Cooler Shroud Removed (Task 6-115)
Oil Cooler Impeller Removed (Task 6-117)



1. **Remove four nuts (1)** and washers (2) **from retainer (3).**
2. **Install** three 1/4-28 **bolts (4)** in threaded holes (5). **Turn bolts to back retainer (3) away** from transmission (6).
3. **Remove packing (7)** from retainer (3).



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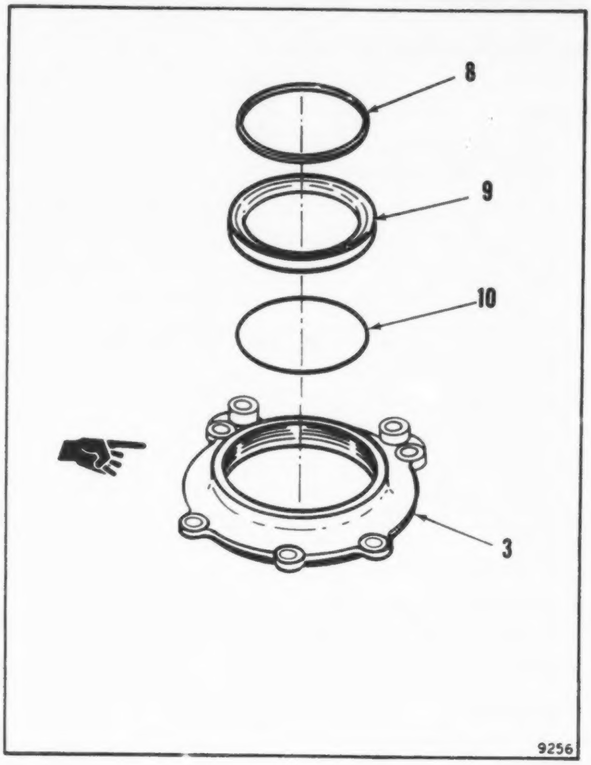
## 6-42 REMOVE FORWARD TRANSMISSION INPUT SHAFT SEAL (Continued) 6-42

4. Remove retaining ring (8) from retainer (3). **Remove seal (9)** and packing (10).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-43 INSTALL FORWARD TRANSMISSION INPUT SHAFT SEAL 6-43

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Aluminum Tube, 4 1/4-Inch OD, 1/8-Inch Wall Thickness, 1 to 6 Inches Long

Gun Heater

Pyrometer

Torque Wrench, 30 to 150 Inch-Pounds

Kevlar Gloves (E187)

***Materials:***

Gloves (E186)

Dry Cleaning Solvent (E162)

Cloths (E120)

***Parts:***

Packings

***Personnel Required:***

Medium Helicopter Repairer

Inspector

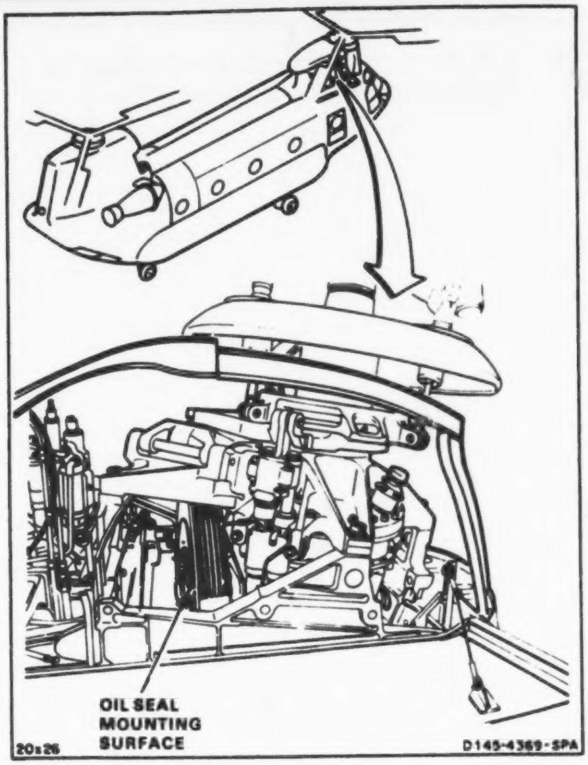
***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



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## 6-43 INSTALL FORWARD TRANSMISSION INPUT SHAFT SEAL (Continued) 6-43

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

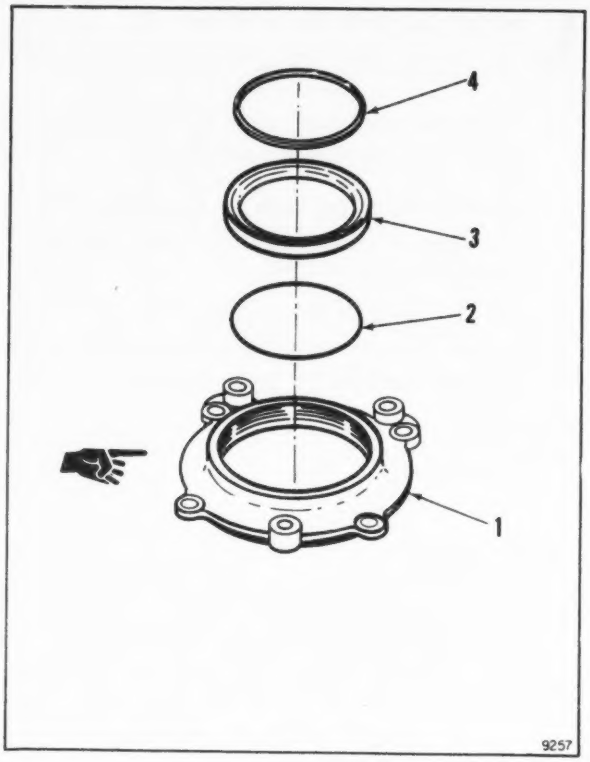
**WARNING**

**Wear Kevlar gloves when handling hot retainer. Hot retainer can burn hands.**

**CAUTION**

**Do not heat retainer over 250 degrees F (120 degrees C). Damage can occur.**

2. **Heat retainer (1) to 230 to 250 degrees F (110 to 120 degrees C)**. Use gun heater. Wear Kevlar gloves (E187). Measure temperature with pyrometer.
3. **Install packing (2)** in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4) in retainer (1).



***INSPECT***

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## 6-43 INSTALL FORWARD TRANSMISSION INPUT SHAFT SEAL (Continued) 6-43

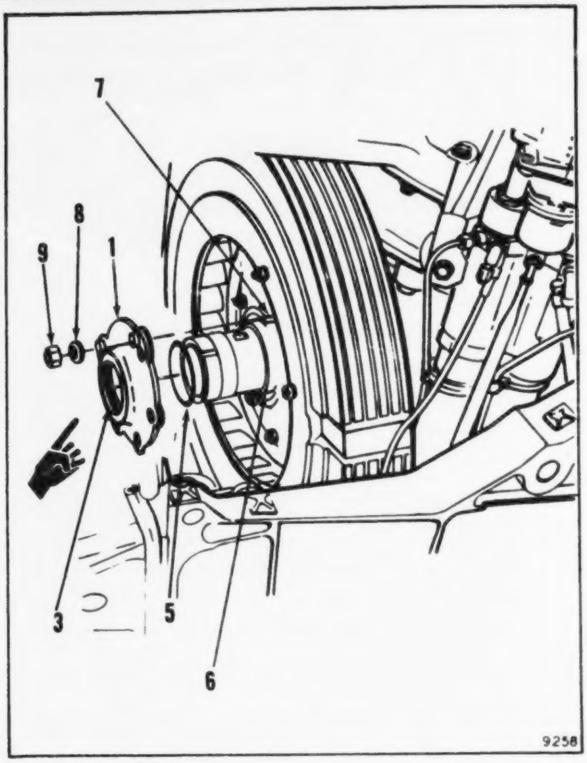
6. **Install packing (5)** in retainer (1).

**CAUTION**

**If seal and shaft are not clean and dry, leakage can occur.**

7. **Clean mating surface of shaft (6)** with dry cleaning solvent (E137). **Wipe seal (3)** with clean cloth (E120).
8. **Install retainer (1)** on four studs (7).
9. **Install four** washers (8) and **nuts (9). Torque nuts to 60 inch-pounds .**

***INSPECT***



FOLLOW-ON MAINTENANCE:

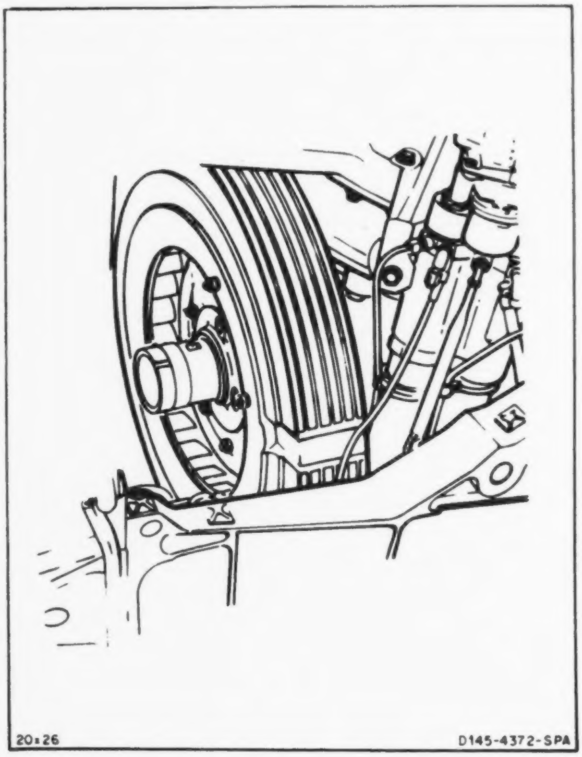
Install oil cooler impeller (Task 6-118).

Install oil cooler shroud (Task 6-116).

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).

Install oil cooler air inlet duct (Task 6-122).

Close forward transmission fairing (Task 2-2).



**END OF TASK**

## 6-44 REMOVE NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL 6-44

INITIAL SETUP

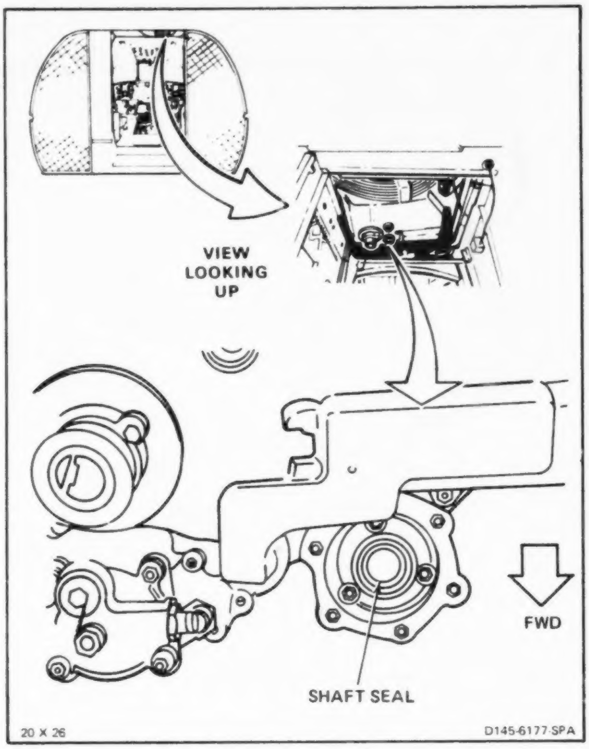
***Applicable Configurations:***
All

***Tools:***
Powertrain Repairer's Tool Kit,
NSN 5180-00-003-5267

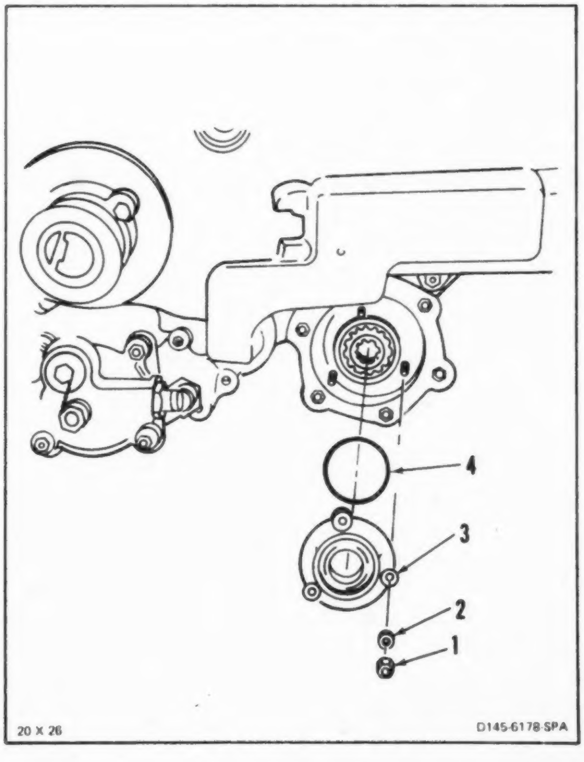
***Materials:***
None

***Personnel Required:***
68D20 Aircraft Powertrain Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
No. 1 Flight Control Hydraulic Pump Removed (Task 7-22)


VIEW LOOKING UP
FWD
SHAFT SEAL
20 X 26
D145-6177-SPA

1. Remove three nuts (1) and washers (2) from retainer (3). **Remove retainer** and packing (4).


4
3
2
1
20 X 26
D145-6178-SPA

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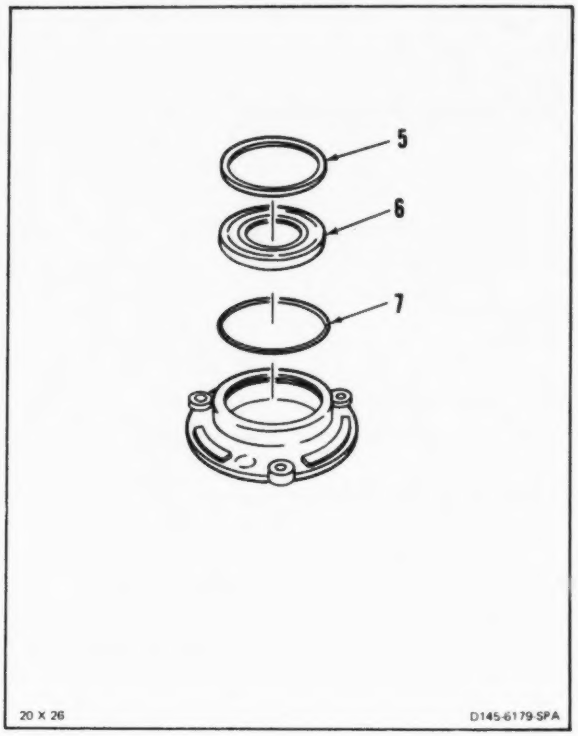
## 6-44 REMOVE NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL (Continued) 6-44

2. Remove retaining ring (5). **Remove seal (6).**
3. Remove packing (7).


5
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7
20 X 26
D145-6179-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-45 INSTALL NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL 6-45

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267

Aluminum Tube, 2-Inch OD, 1/8-Inch Wall Thickness, 1 to 6 Inches Long

Gun Heater

Pyrometer

Torque Wrench, 5 to 50 Inch-Pounds

Kevlar Gloves (E187)

***Materials:***

Dry Cleaning Solvent (E162)

Cloths (E120)

Oil (E254)

Grease (E190)

Gloves (E186)

***Parts:***

Packings

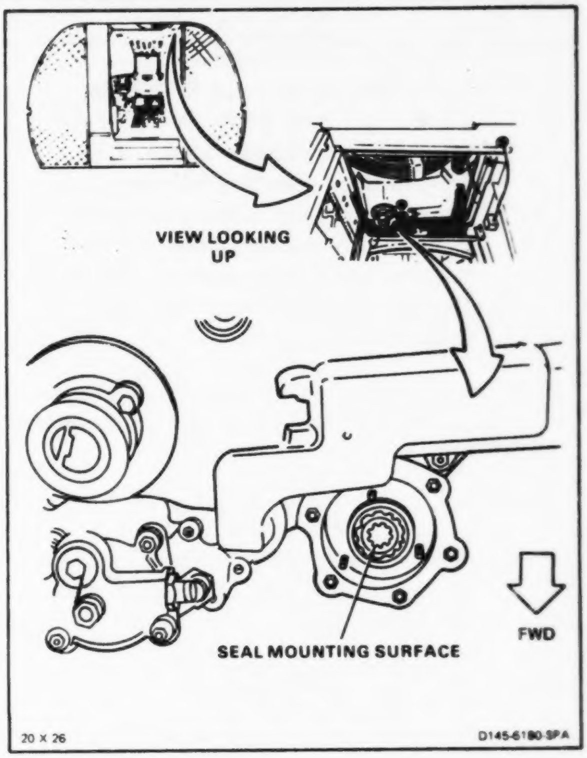
***Personnel Required:***

Aircraft Powertrain Repairer

Inspector

***References:***

TM 55-1520-240-23P


VIEW LOOKING UP
SEAL MOUNTING SURFACE
FWD
20 X 26
D145-6180-SPA

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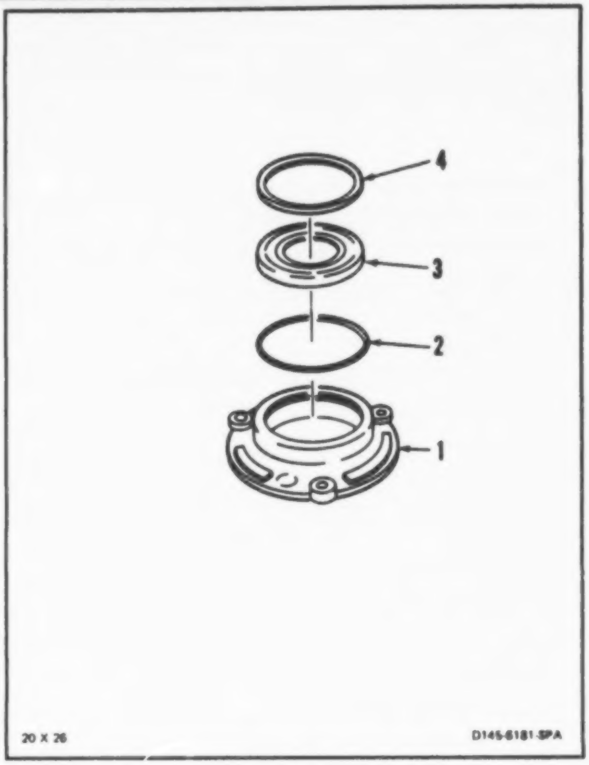
## 6-45 INSTALL NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL (Continued) 6-45



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes . Get medical attention for eyes.**

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

**WARNING**

**Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.**

**CAUTION**

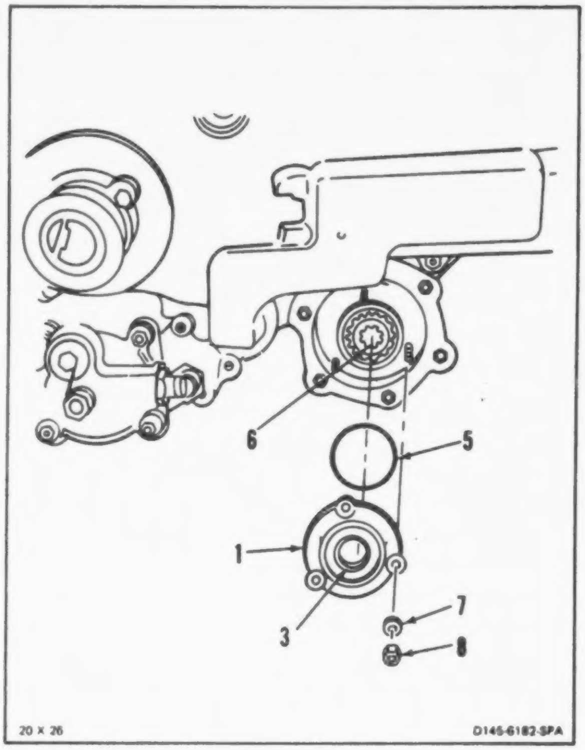
**Do not heat retainer over 250°F (120°C). Heat can damage metal.**

2. Heat retainer (1) to **230 to 250°F (110 to 120°C)** . Use gun-type heater and pyrometer. Wear Kevlar gloves (E187).
3. Coat packing (2) with oil (E254). Install packing in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. **Install retaining ring (4).**

*GO TO NEXT PAGE*

## 6-45 INSTALL NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL (Continued) 6-45

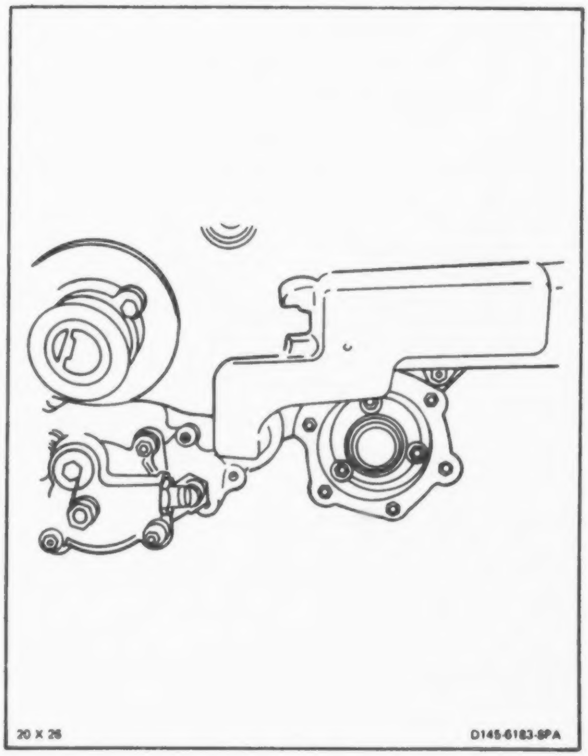
6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on shaft.
8. Install three washers (7) and nuts (8). **Torque nuts to 20 inch-pounds.**



FOLLOW-ON MAINTENANCE:

Install No. 1 flight control hydraulic pump (Task 7-27).

Install forward transmission drip pan (Task 2-3).



**END OF TASK**

## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE 6-46

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1-Inch
Container, Two Quart
Work Hoist
Hoisting Eye (T32)
Torque Pack (T23)
Torque Reactor Assembly (T159)
Tee Handle (T161)
Torque Applicator (T2)
Socket Adapter (T93)
Transportation Trailer 2000
Roller Adapter 2550 (4)
Forward Transmission Adapter (T15)
Rope Guide Lines

***Materials:***

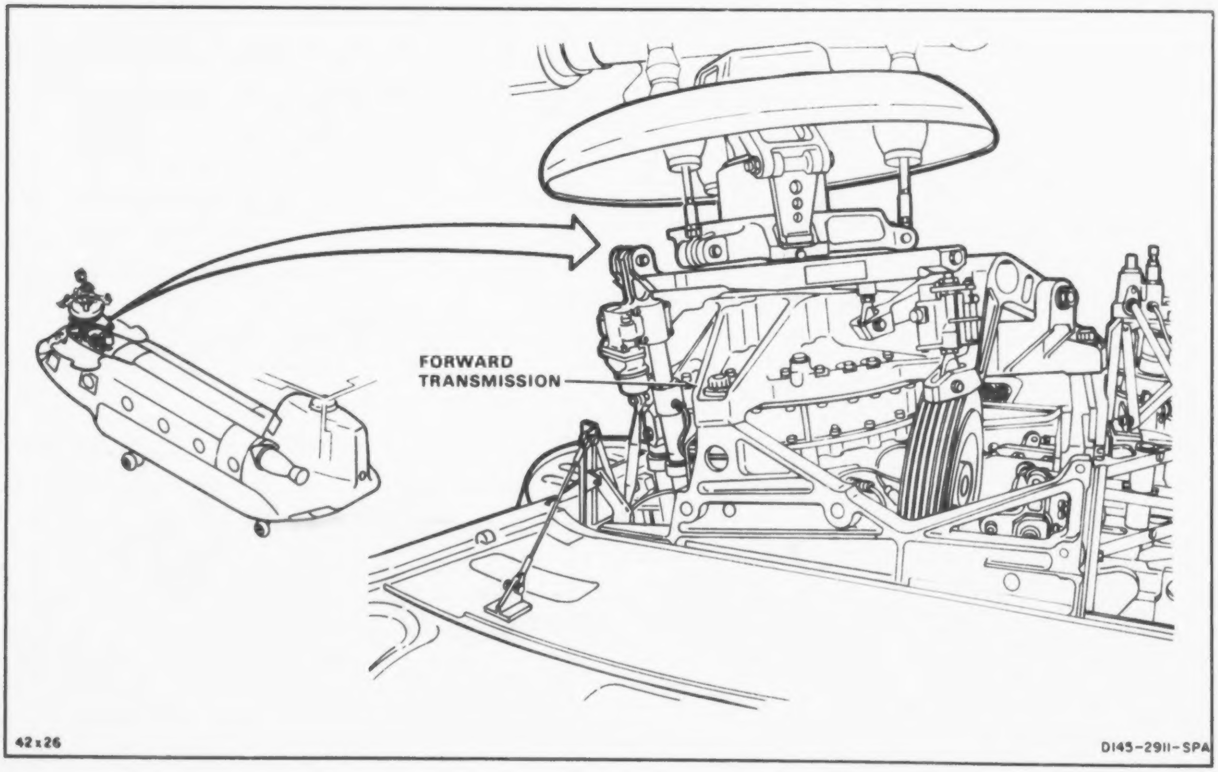
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)
Paper Tags (E264)

***Personnel Required:***

Medium Helicopter Repairer (3)

***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Forward Rotary-Wing Blades Removed (Task 5-64)
Forward Transmission Fairing Removed (Task 2-62 and 2-63)
Forward Transmission Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)
Forward Transmission Adapter Assembly Removed (Task 6-5)
Both Forward Connecting Links Removed (Task 11-194)



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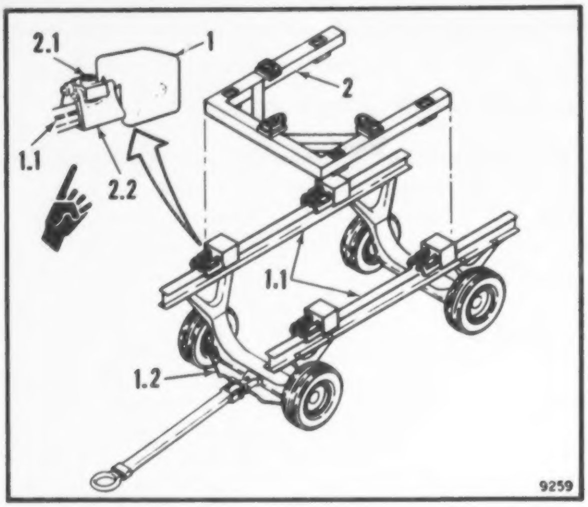
## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

1. **Fit four roller adapters (1)** on two rails (1.1) of trailer (1.2).

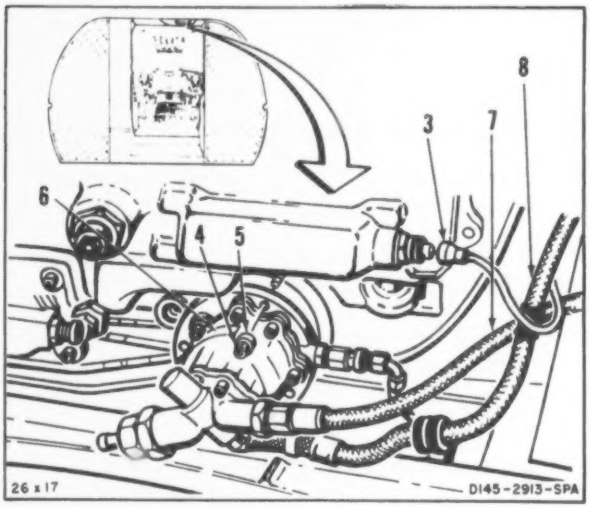
   1.1 With aid of helper, **position adapter (2) on roller adapters (1).**

   1.2 **Turn fitting (2.1)** of each roller adapter (1) clockwise until clamp (2.2) fits tightly against rail (1.1).

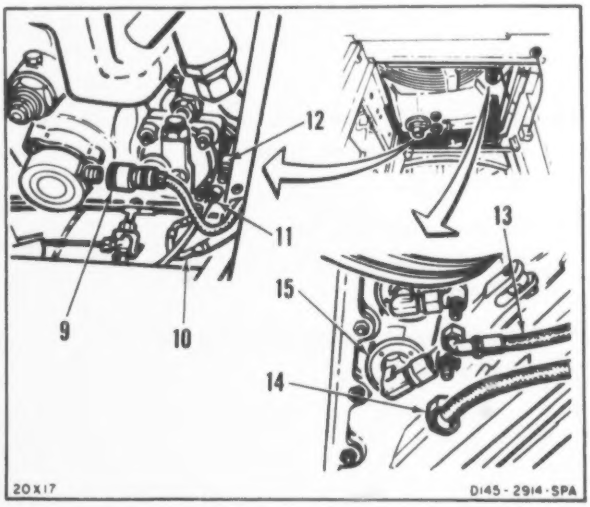


*DISCONNECT LOWER POINTS*

2. **Disconnect oil temperature connector (3).**
3. **Remove four mounting nuts (4)** and washers (5) from hydraulic pump (6).
4. **Disconnect pump (6)** by pulling pump straight down. Pump shall hang by hoses (7 and 8).



5. **Disconnect chip detector plug (9).**
6. **Disconnect hoses (10 and 11)** from left servocylinder (12). Let fluid drain into container.
7. **Disconnect hoses (13 and 14)** from right servocylinder (15). Drain fluid into container.



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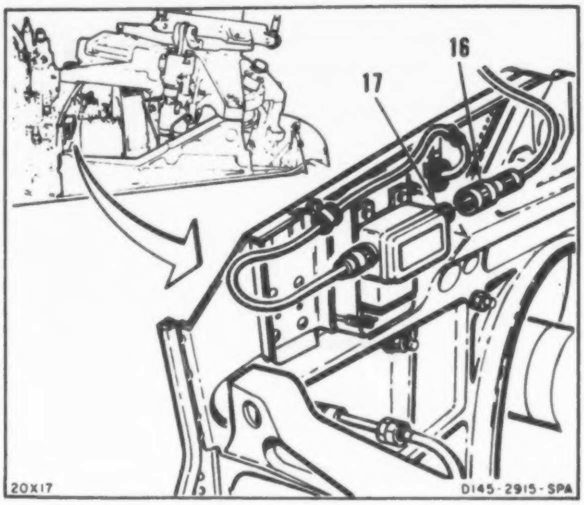
## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

*DISCONNECT UPPER POINTS*

8. **Disconnect connector (16)** from signal conditioner (17).


16
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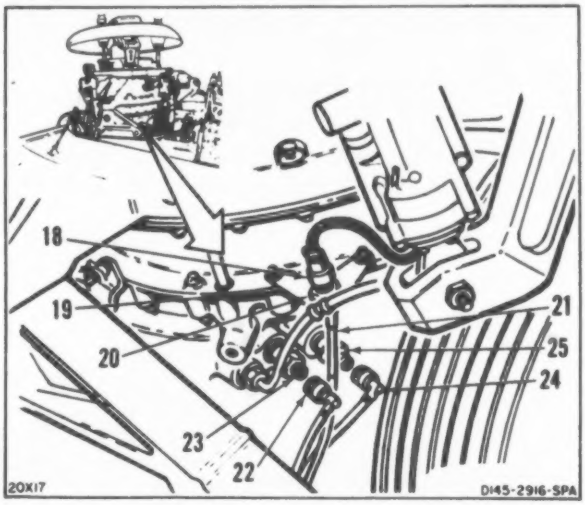
20X17
D145-2915-SPA

9. **Disconnect connector (18)** at bracket (19).
10. Remove nut (20). **Remove electrical connector (21)** from bracket (19).
11. Tag and **disconnect electrical connector (22)** from MAIN PRESS. SW (23).
12. Tag and **disconnect electrical connector (24)** from AUX PRESS. SW (25).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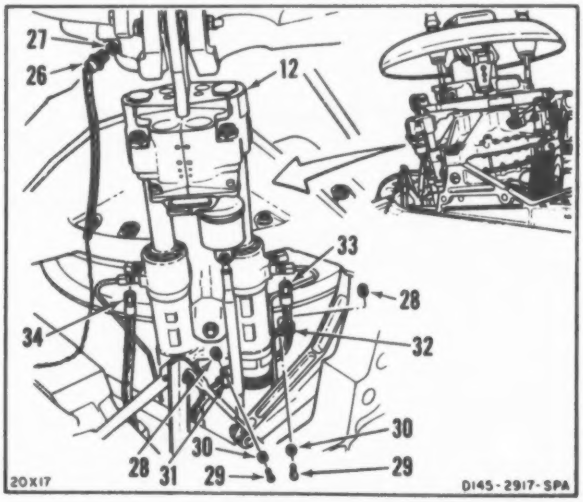
D145-2916-SPA

13. Remove lockwire from electrical connector (26). **Disconnect connector** from phase detector (27).
14. Remove nut (28), screw (29) and washer (30) from clamps (31 and 32) on hose (33) at left servocylinder (12).
15. **Disconnect hoses (33 and 34)** from servocylinder (12).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D145-2917-SPA

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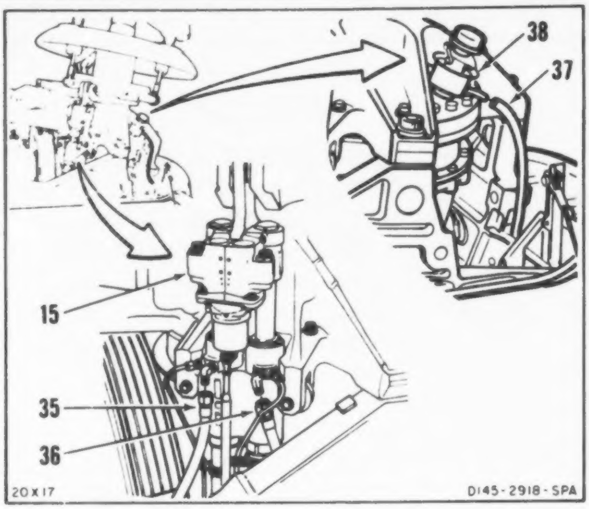
## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

16. **Disconnect hoses (35 and 36)** from right servocylinder (15). Drain fluid into container.
17. **Disconnect hose (37)** from oil drain cup (38).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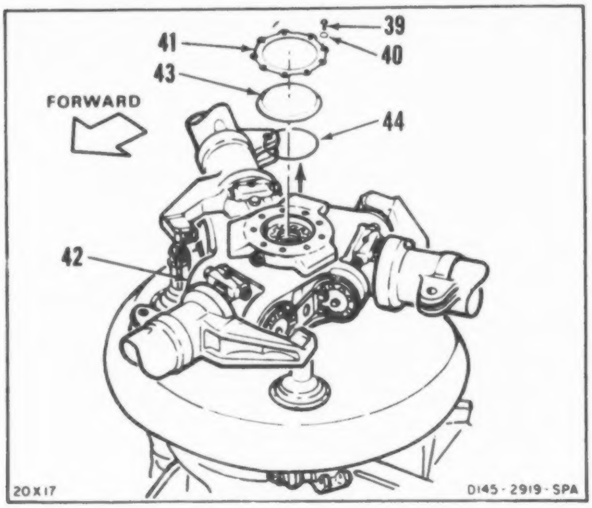
37
15
35
36
20X17
D145-2918-SPA

*CONNECT HOIST*

18. Remove nine screws (39) and washers (40) from retainer (41) on rotary-wing head (42). **Remove retainer, cover (43),** and packing (44).


39
41
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43
FORWARD
44
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D145-2919-SPA

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## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

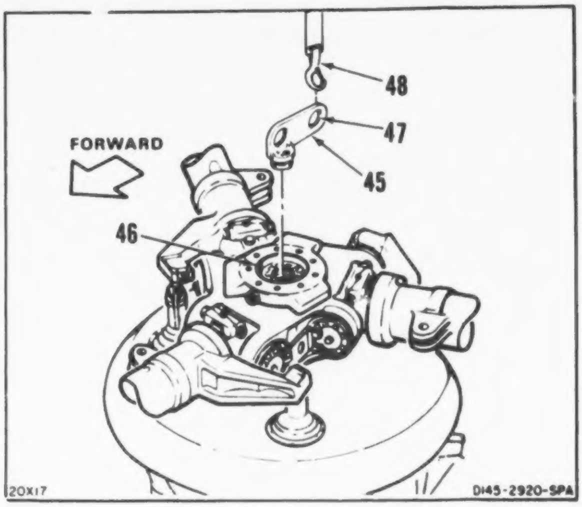
19. Check thread of hoisting eye (T32) (45) and shaft (46). Threads shall be clean and undamaged. If needed, clean with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

**NOTE**

Hoisting eye (T32) must trail aft to keep transmission at proper angle during hoisting.

20. **Install hoisting eye (T32) (45)** on shaft (46) so that FWD XMSN hole (47) trails aft.

21. **Connect work hoist hook (48)** to FWD XMSN hole (47) of hoisting eye (T32) (45). Raise hoist to **take up slack in chain.** Do not apply tension.



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## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

***REMOVE BOLTS***

**NOTE**

Socket assembly, torque applicator and reactor are part of torque reactor assembly (T159).

22. Loosen left bolt (49) as follows:
    a. **Install socket assembly (49.1)** on left bolt (49).
    b. **Install torque applicator (50)** over square drive of socket assembly (49.1) **with large hole aft** of assembly. Note THIS SIDE UP on applicator.
    c. **Install sleeve (50.1) on aft end of applicator (50).** Insert two pins (50.2) through sleeve and adapter.
    d. **Install** aft end of **sleeve (50.1) in center block (50.3) of reactor (51). Install socket** at end of reactor on aft bolt (51.1).
    e. **Install pin (51.2)** through center block (50.3) and applicator (50).
    f. **Set selector (51.3)** at bottom of torque pack (T23) (52) **to NUT OFF.**
    g. **Install torque pack (T23) (52)** on square drive of socket assembly (49.1). Turn pack so that two pins (52.1) on bottom fit holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

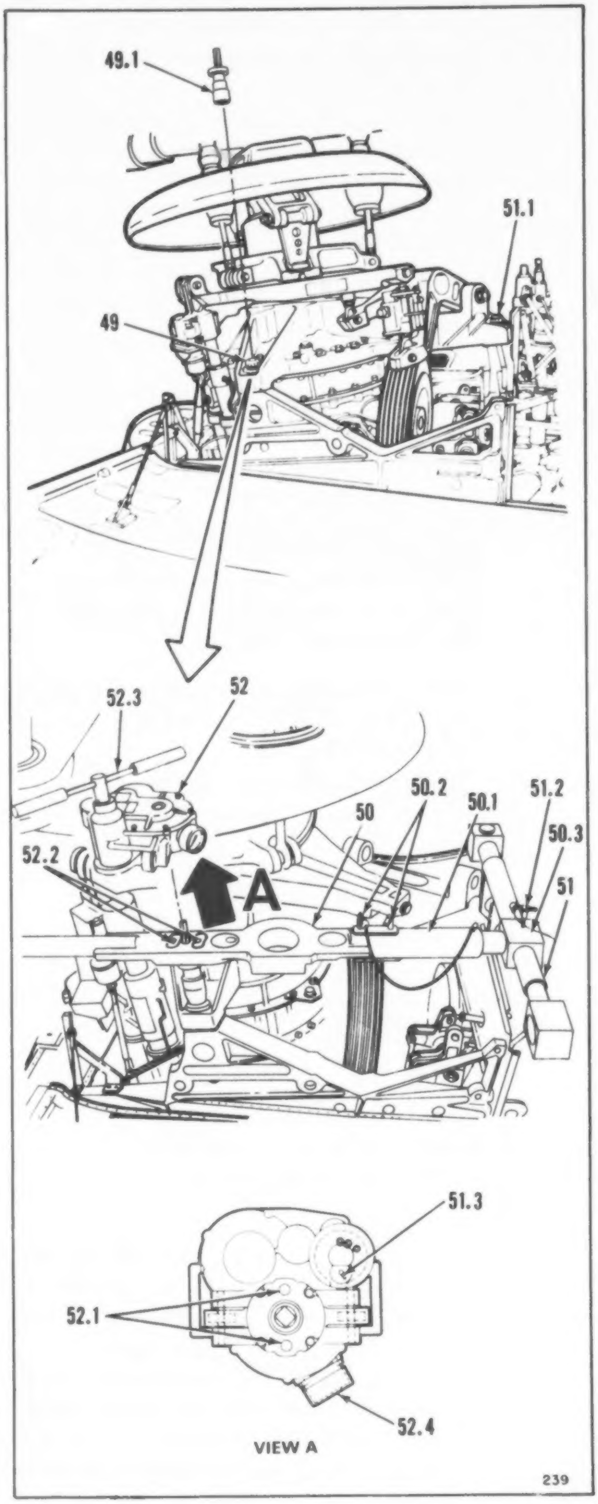
**WARNING**

**Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

**CAUTION**

**If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.**

    h. Set selector switch on tee handle (T161) (52.3) to OFF. Install handle on torque pack (T23) (52). Turn handle counterclockwise until torque is broken.
    i. Set switch on handle (T161) (52.3) to ON. Turn handle clockwise until indicator (52.4) reads 0 and torque pack is loose.
    j. Remove torque pack (52) and torque reactor assembly (T159).
    k. Take sleeve (50.1) off applicator (50).
    l. Do not remove left bolt (49).



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22.1. Loosen aft bolt (51.1) as follows:

a. **Install socket assembly (49.1)** on aft bolt (51.1).

b. **Install torque applicator (50)** over square drive of socket assembly (49.1) **with large hole at left** of assembly. Observe THIS SIDE UP stamping on applicator.

c. **Install** left end of **applicator (50) in end block of reactor (51). Install socket** at end of reactor on left bolt (49).

d. **Install pin (51.2)** through end of reactor (51) and applicator (50).

**WARNING**

**Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

e. **Check that ratchet selector (51.3)** at bottom of torque pack (T23) (52) **is set to NUT OFF.**

f. **Install torque pack (T23) (52)** on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

**CAUTION**

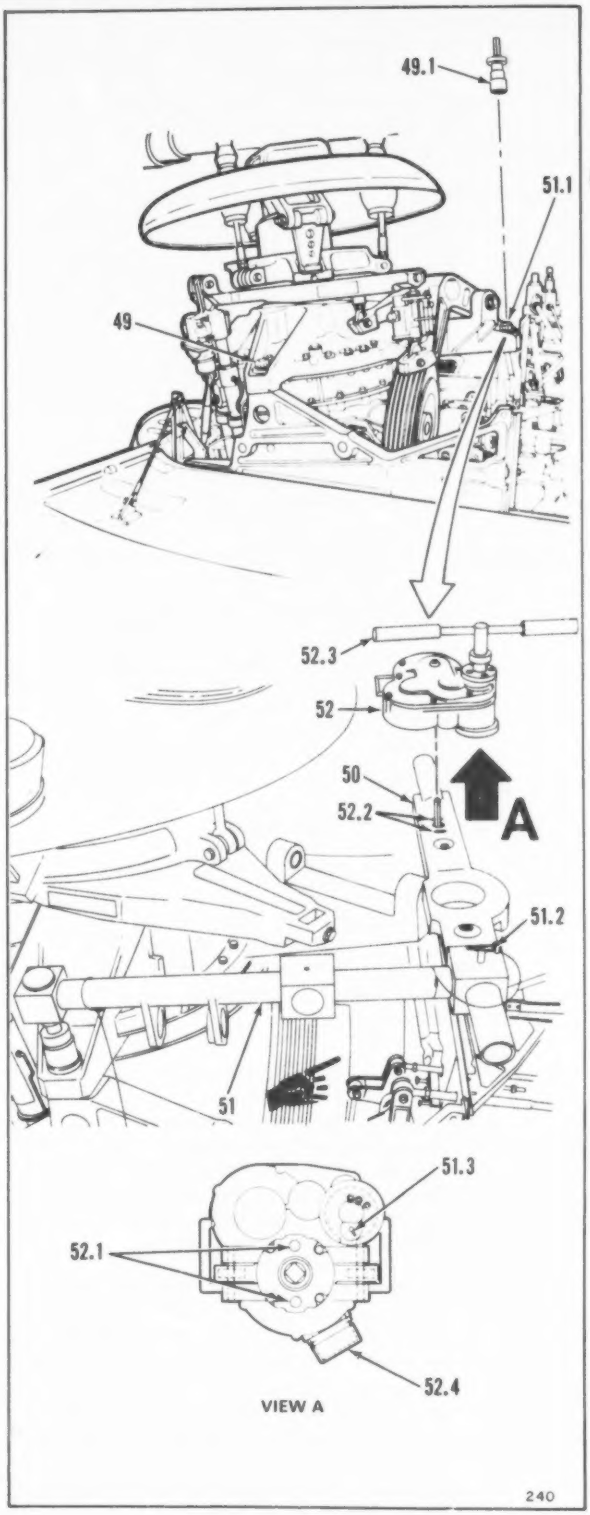
**If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.**

g. Set selector switch on tee handle (T161) (52.3) to OFF. Install handle on torque pack (T23) (52). Turn handle counterclockwise until torque is broken.

h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until torque indicator (52.4) reads 0 and torque pack is loose.

i. Remove torque pack (52) and torque reactor assembly (T159).

j. Do not remove aft bolt (51.1).



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22.2. Loosen right bolt (52.5) as follows:

a. Install socket assembly (49.1) on right bolt (52.5).

b. Install torque applicator (50) over square drive of socket assembly (49.1) with large hole forward of assembly. Observe THIS SIDE UP stamping on applicator.

c. Install forward end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on forward bolt (52.6).

d. Install pin (51.2) through center block (50.1) and applicator (50).

**WARNING**

**Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

e. Check that ratchet selector (51.3) at bottom of torque pack (T23) (52) is set to NUT OFF.

f. Install torque pack (T23) (52) on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3).

**CAUTION**

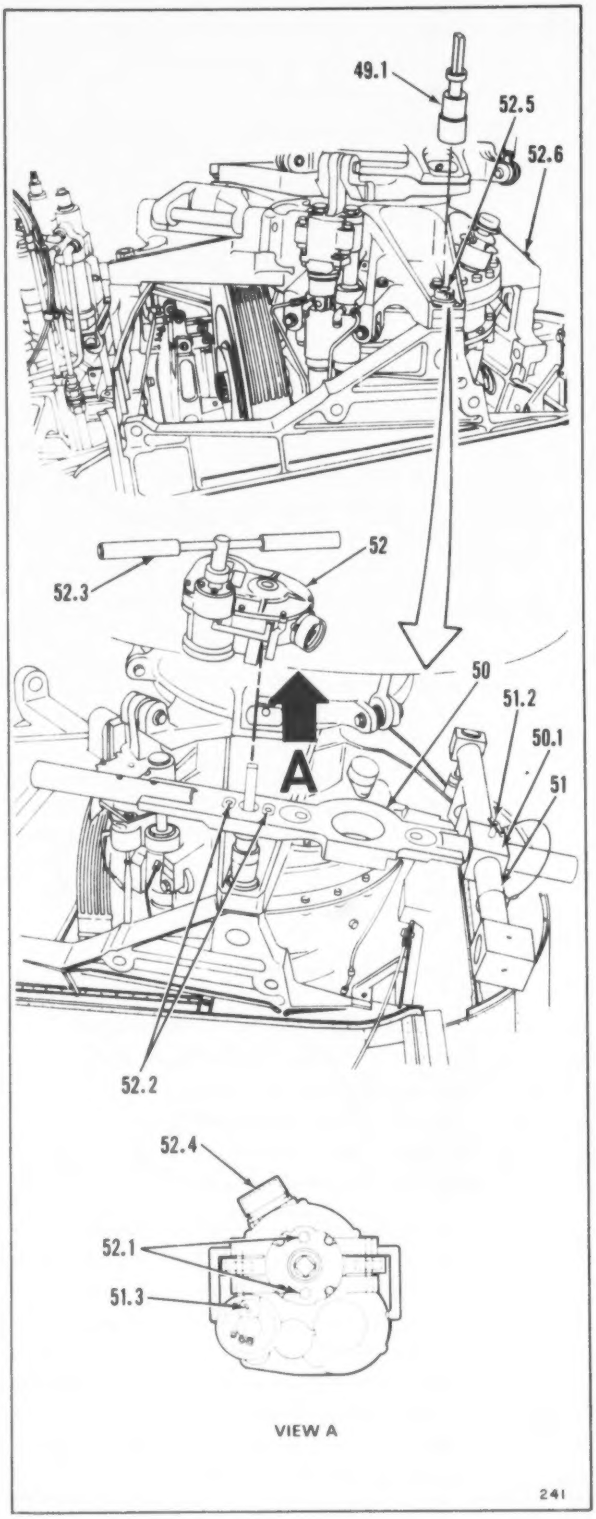
**If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.**

g. Set selector switch on tee handle (T161) (52.3) to OFF. Turn handle counterclockwise until torque is broken.

h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until indicator (52.4) reads 0 and torque pack is loose.

i. Remove torque pack (52) and torque reactor assembly (T159).

j. Do not remove right bolt (52.5).



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## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

22.3. Loosen forward bolt (52.6) as follows:

a. Install socket assembly (49.1) on forward bolt (52.6).

b. Install torque applicator (50) over square drive of socket assembly (49.1) with large hole at right of assembly. Observe THIS SIDE UP stamping on applicator.

c. Install right end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on right bolt (52.5).

d. Install pin (51.2) through center block (50.1) and applicator (50).

**WARNING**

**Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

e. Check that ratchet selector (51.3) at bottom of torque pack (T23) (52) is set to NUT OFF.

f. Install torque pack (T23) (52) on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

**CAUTION**

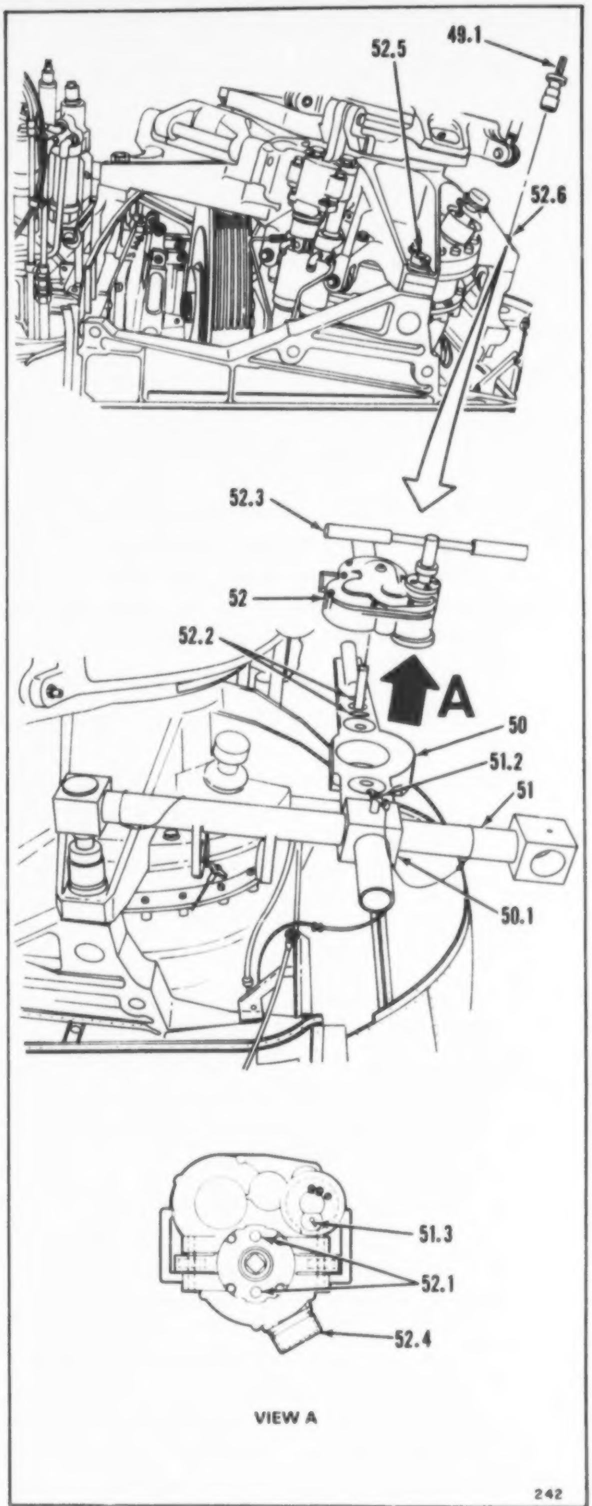
**If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.**

g. Set selector switch on tee handle (T161) (52.3) to OFF. Turn handle counterclockwise until torque is broken.

h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until torque indicator (52.4) reads 0 and torque pack is loose.

i. Remove torque pack (52) and torque reactor assembly (T159).

j. Go to step 22.8.



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### *REMOVE BOLTS (ALTERNATE METHOD)*

**NOTE**

Torque applicator and reactor are part of torque reactor assembly (T159).

22.4. Loosen left bolt (49) as follows:

a. **Install socket adapter (T93) (52.7)** on left bolt (49).

b. **Install torque applicator (50)** with large hole over drive of socket adapter (T93) (52.7). Observe THIS SIDE UP stamping on applicator.

c. **Install sleeve (50.1) on aft end of applicator (50).** Insert two pins (50.2) through sleeve and adapter.

d. **Install** aft end of **sleeve (50.1) in center block (50.3) of reactor (51). Install socket** at end of reactor on aft bolt (51.1).

e. **Install pin (51.2)** through center block (50.3) and applicator (50).

f. **Install torque applicator pack** (T2) (52.8) on drive of socket adapter (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.

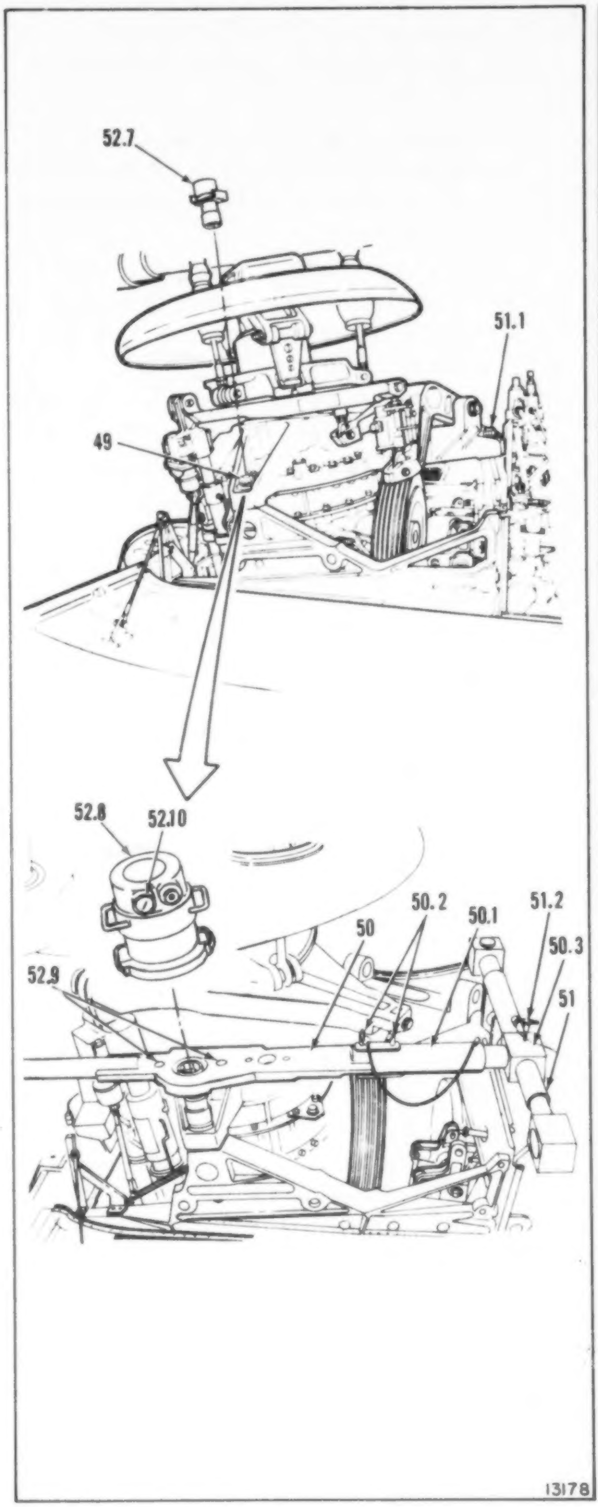
g. Install speed handle on torque pack (T2) (52.8). Turn handle counterclockwise until torque is broken.

h. Turn speed handle clockwise until torque indicator (52.10) reads 0 and torque pack is loose.

i. Remove torque pack (52.8) and torque reactor assembly (T159).

j. Remove sleeve (50.1) from applicator (50).

k. Do not remove left bolt (49).



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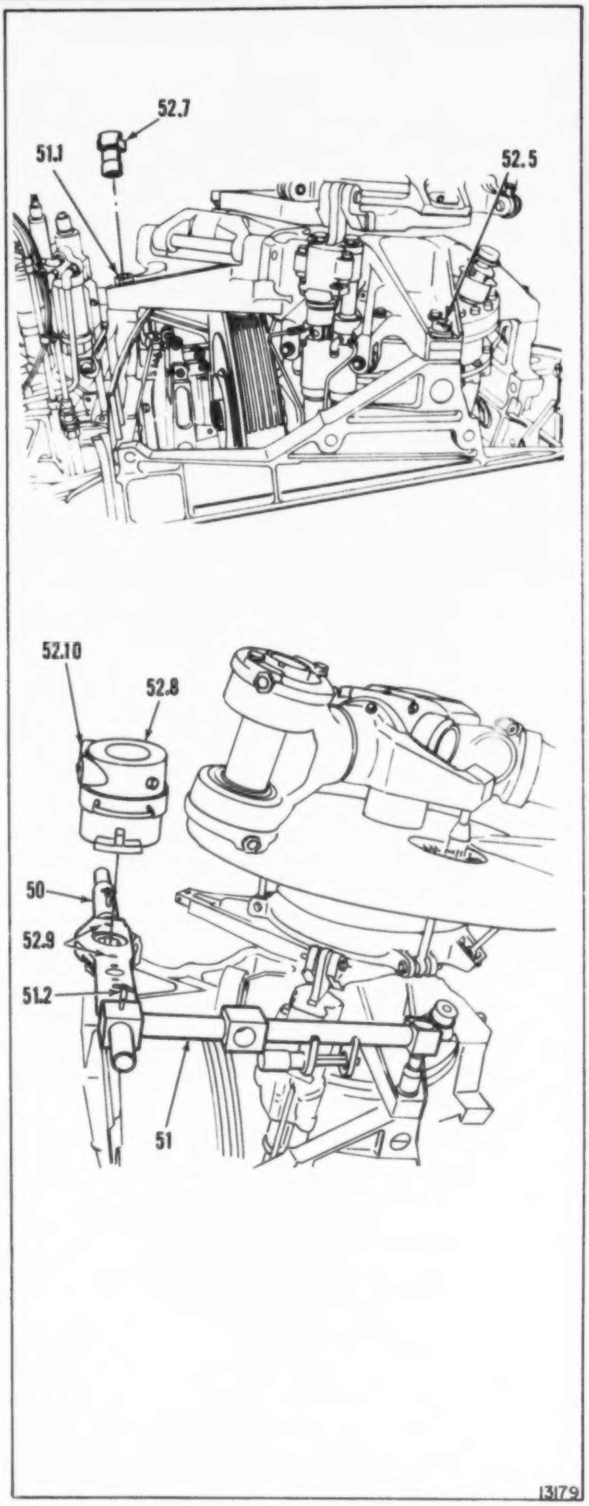
## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

22.5. Loosen aft bolt (51.1) as follows:

- a. **Install socket adapter (T93) (52.7)** on aft bolt (51.1).
- b. **Install torque applicator (50) with large hole** over drive of socket adapter (52.7). Observe THIS SIDE UP stamping on applicator.
- c. **Install** left end of **applicator (50) in end block of reactor (51). Install socket** at end of reactor on right bolt (52.5).
- d. **Install pin (51.2)** through end block of reactor (51) and applicator (50).
- e. **Install torque applicator pack (T2) (52.8)** on drive of socket adapter (T93) (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.
- f. Install speed handle on torque pack (T2) (52.8). Turn handle counterclockwise until torque is broken.
- g. Turn speed handle clockwise until torque indicator (52.10) reads 0 and torque pack is loose.
- h. Remove torque pack (52.8) and torque reactor assembly (T159).
- i. Do not remove aft bolt (51.1).



13179

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## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

22.6. Loosen right bolt (52.5) as follows:

a. Install socket adapter (T93) (52.7) on right bolt (52.5).

b. Install torque applicator (50) over square drive of socket adapter (T93) (52.7). Observe THIS SIDE UP stamping on applicator.

c. Install forward end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on forward bolt (52.6).

d. Install pin (51.2) through center block (50.1) and applicator (50).

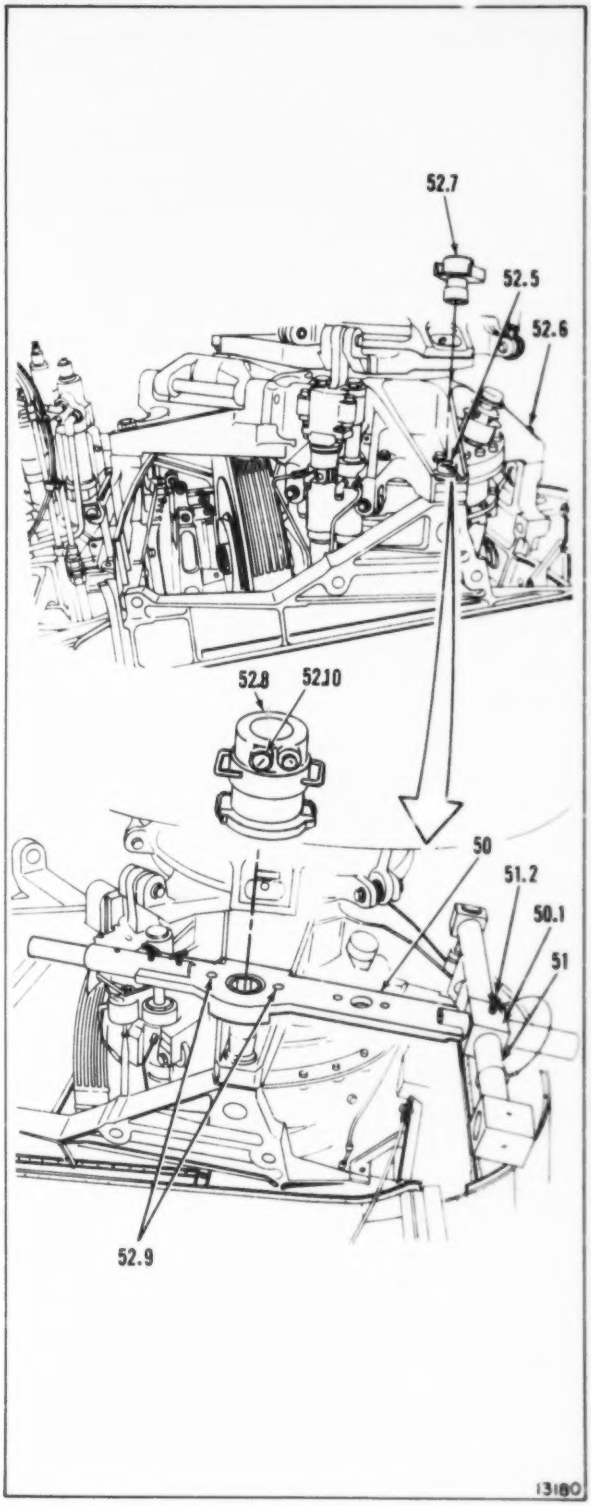
e. Install torque applicator pack (T2) (52.8) on drive of socket adapter (52.7). Rotate pack so that two pins (52.1) on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.

f. Turn speed handle counterclockwise until torque is broken.

g. Turn speed handle clockwise until indicator (52.10) reads 0 and torque pack is loose.

h. Remove torque pack (52.8) and torque reactor assembly (T159).

i. Do not remove right bolt (52.5).



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## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

22.7. Loosen forward bolt (52.6) as follows:

a. Install socket adapter (T93) (52.7) on forward bolt (52.6).

b. Install torque applicator (50) with large hole over drive of socket adapter (52.7). Observe THIS SIDE UP stamping on applicator.

c. Install right end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on left bolt (49).

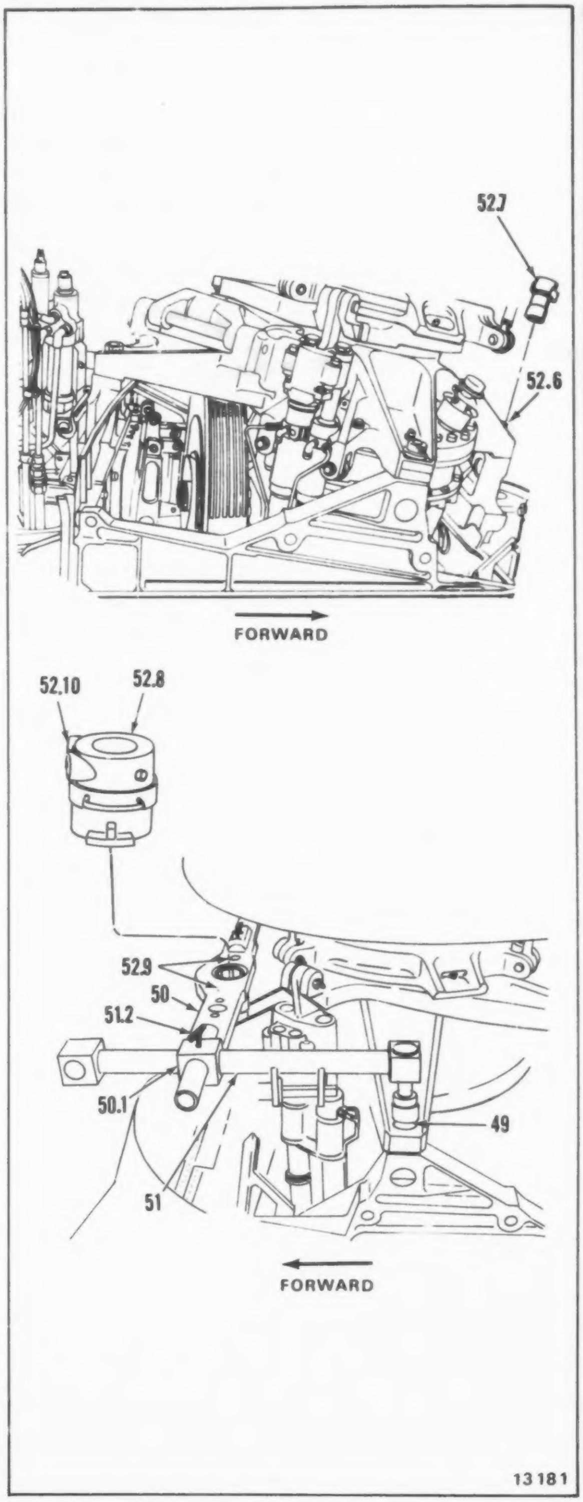
d. Install pin (51.2) through center block (50.1) and applicator (50).

e. Install torque pack (T23) (52) on drive of socket adapter (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.

f. Turn speed handle counterclockwise until torque is broken.

g. Turn speed handle clockwise until torque indicator (52.10) reads 0 and torque pack is loose.

h. Remove torque pack (52.8) and torque reactor assembly (T159).



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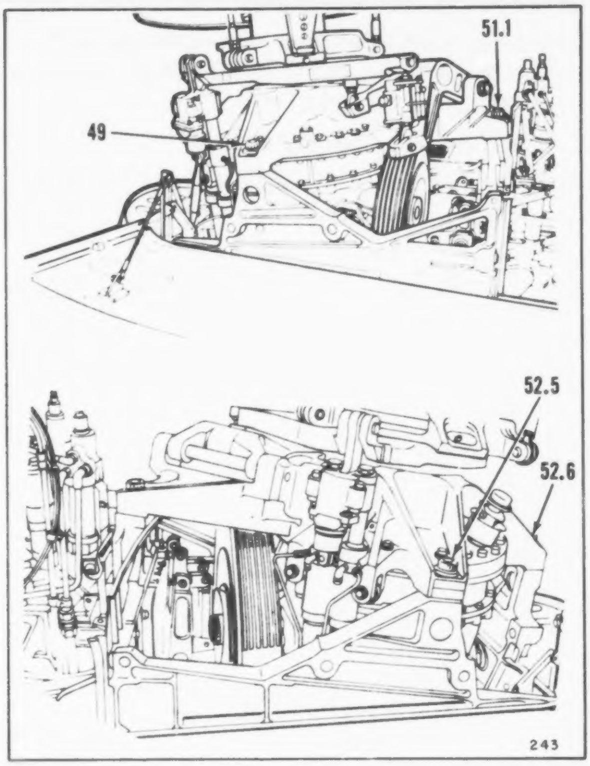
## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46

22.8. Remove bolts (49, 51.1, 52.5, and 52.6).



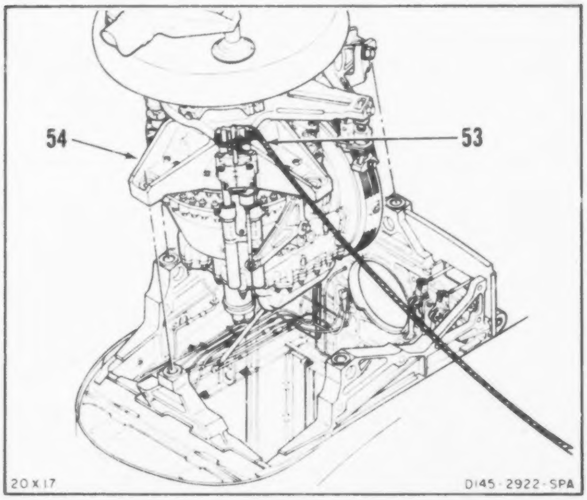
23. Attach a rope guide line (53) to each side of transmission (54).

**WARNING**

**Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.**

24. **Slowly raise transmission (54) about 1-inch** . Check that all wires, hoses, and links between transmission and helicopter have been disconnected.

25. **Lift transmission (54)** out of helicopter. Have helpers guide transmission with rope guide lines (53).



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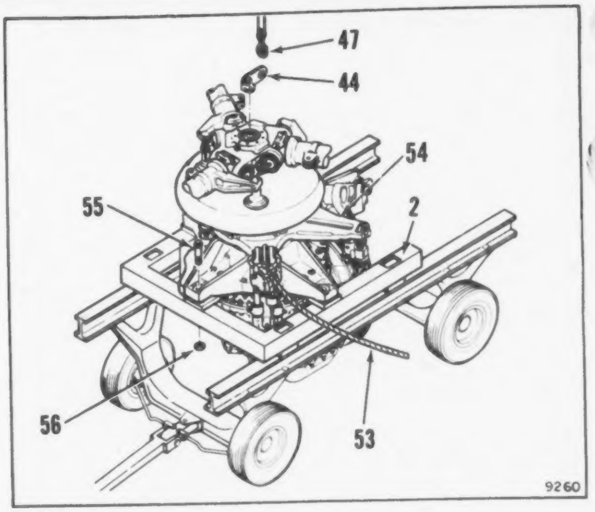
## 6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued) 6-46



26. **Lower and position transmission (54) onto adapter (T15) (2).** Install three bolts (55) and nuts (56).
27. Remove rope guide lines (53).
28. Remove work hoist hook (47) from hoisting eye (44). Remove eye.

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE 6-47

INITIAL SETUP

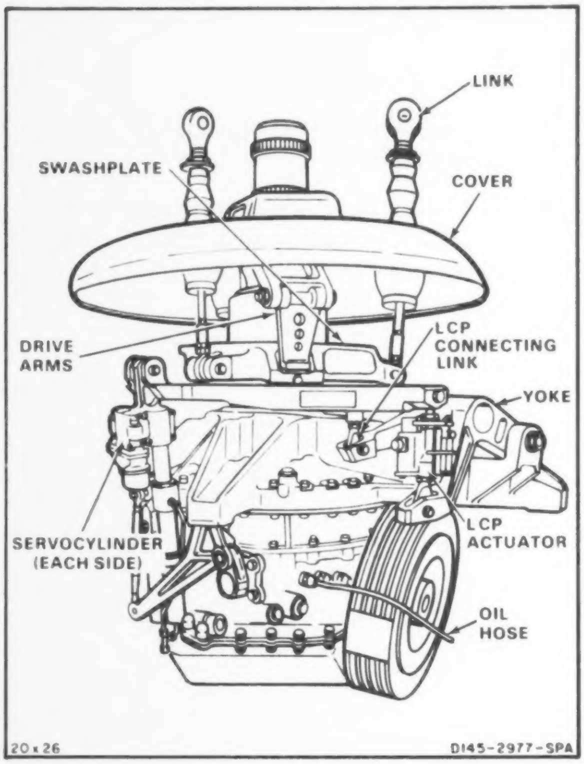
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Rotor Head Controls Sling (T14)
Hoist
Wrench, 1 1/16-Inch
Wrench, 1 7/16-Inch
Aluminum Bar, 1/2-Inch Diameter x 17 Inches Long

***Materials:***
Tape (388)
Lockwire (E231)

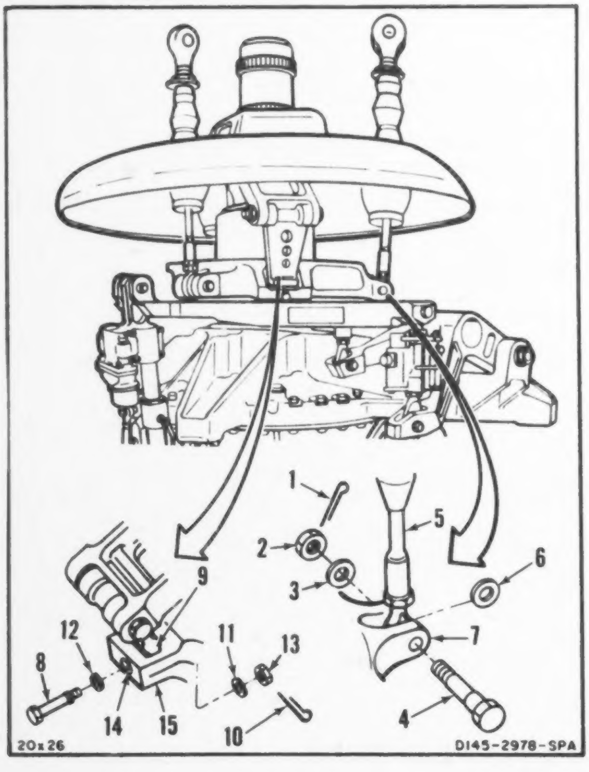
***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U20 Medium Helicopter Repairer

***Equipment Condition:***
Off Helicopter Task
Rotary-Wing Head Removed (Task 5-8)


LINK
SWASHPLATE
COVER
DRIVE ARMS
LCP CONNECTING LINK
YOKE
SERVOCYLINDER (EACH SIDE)
LCP ACTUATOR
OIL HOSE
20x26
D145-2977-SPA

### *REMOVE COVER, LINKS, AND DRIVE ARMS*

1. Remove cotter pin (1), nut (2), washer (3), and bolt (4) from each of three pitch links (5). **Remove three links and limiters (6)** from swashplate lugs (7).
2. Remove lockwire from bolt (8) in lower drive arm (9). **Remove** cotter pin (10), **bolt,** washers (11 and 12) and nut (13). Check that bushing (14) remains in swashplate lug (15). Keep bushing in lug with lockwire (E231).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D145-2978-SPA

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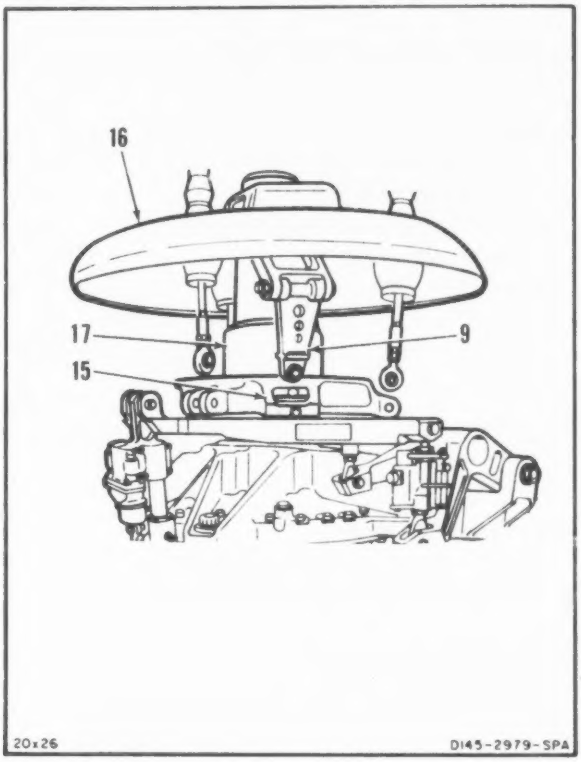
## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

**CAUTION**

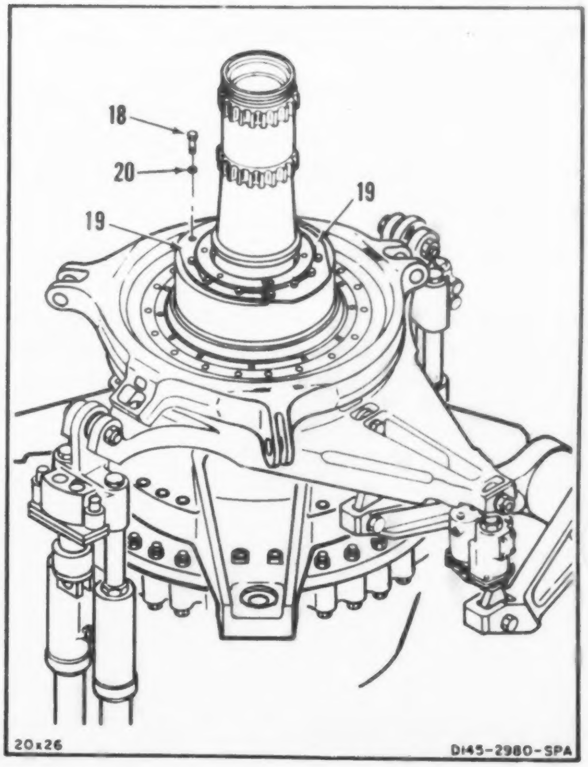
**If arm hits slider shaft, shaft can be damaged.**

3. Have two helpers **slowly lift cover (16).** As cover is lifted, **pull lower drive arm (9)** out of swashplate lug (15). Hold arm to keep it from hitting slider shaft (17).


16
17
9
15
20x26
D145-2979-SPA

### *REMOVE SWASHPLATE*

4. Remove lockwire from six bolts (18) on each half of seal (19). Remove 12 bolts and washers (20). **Remove both halves of seal.**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20x26
D145-2980-SPA

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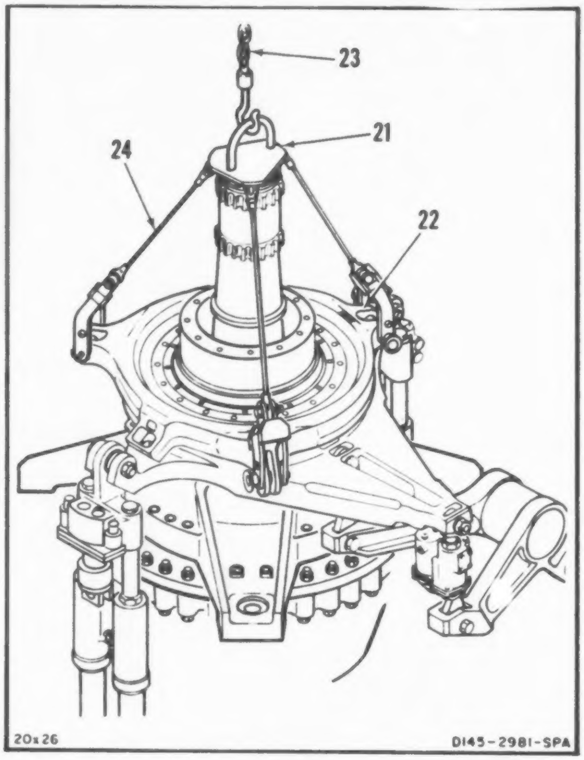
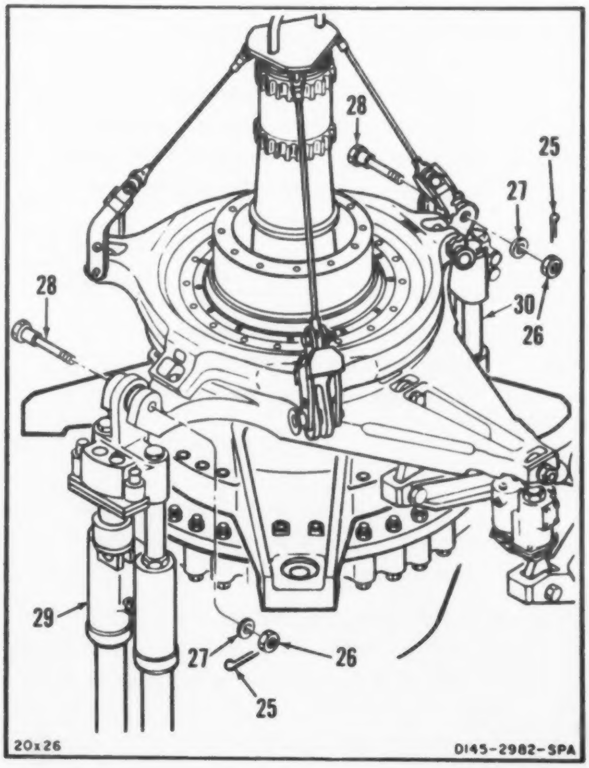
## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

5. **Attach sling (T14) (21)** to three lugs (22). **Attach work hoist chain (23)** to sling. Raise hoist to take up slack from sling cables (24). Do not put tension on sling.


23
21
24
22
20x26
D145-2981-SPA

6. **Remove** cotter pin (25), nut (26), washer (27), and **bolt (28)** from upper end of both servocylinders (29 and 30).


28
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D145-2982-SPA

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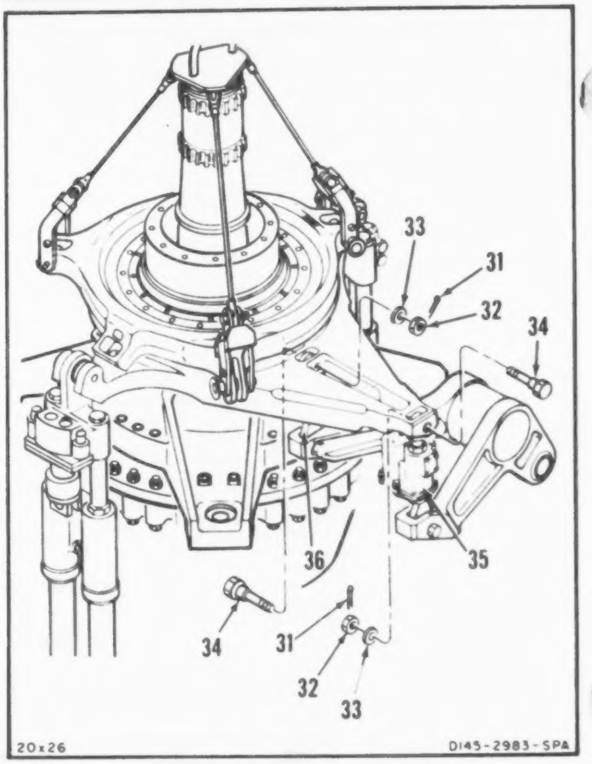
## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

7. **Remove** cotter pins (31), nuts (32), washers (33), and **bolts (34)** from actuator (35) and link (36).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D145-2983-SPA

**WARNING**

**Swashplate is heavy and can injure personnel if it drops. Swashplate must be supported by hoist and moved carefully to prevent injury to personnel.**

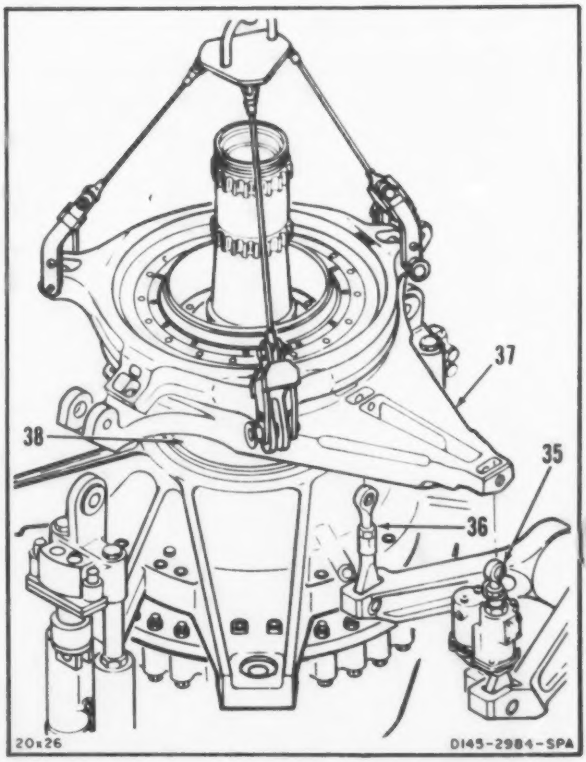
**CAUTION**

**If actuator or link twist or fall, they can be damaged or cause damage to other components.**

**CAUTION**

**If bearing hits or binds on slider shaft, bearing surfaces can be damaged.**

8. **Lift swashplate (37)** from shaft (38). Do not let actuator (35) or link (36) twist or fall fall. Do not let swashplate hit or bind on shaft.


37
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20x26
D145-2984-SPA

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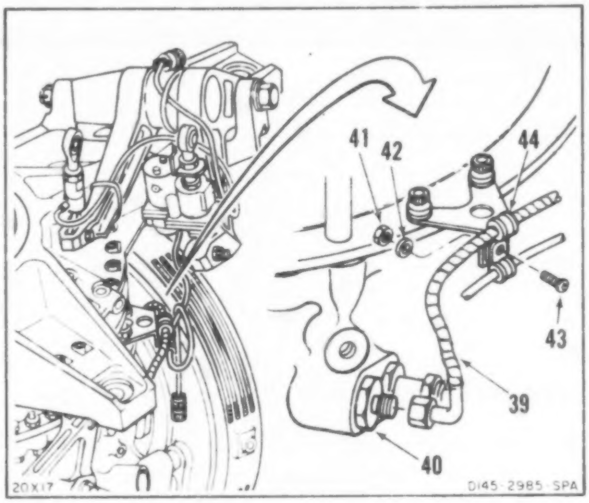
## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

### *REMOVE TRANSDUCER OIL HOSE*

9. Disconnect oil hose (39) from reducer (40).
10. Remove nut (41), washer (42), and screw (43) from clamp (44).
11. **Remove hose (39) with clamp (44).**


41
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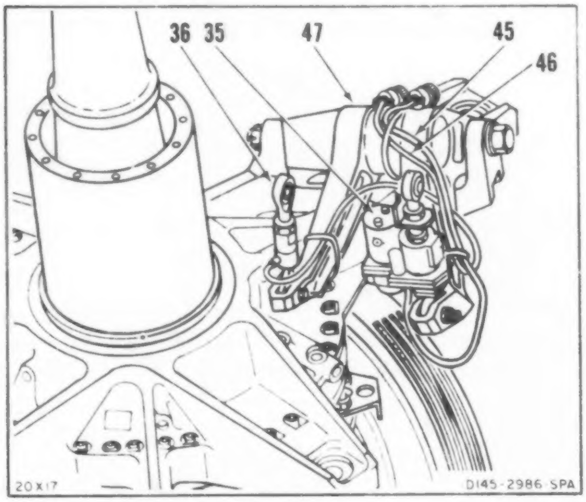
20X17
D145-2985-SPA

### *REMOVE YOKE*

12. Secure cables (45 and 46) away from actuator (35) and link (36). Tape them to yoke (47). Use tape (E388).


36
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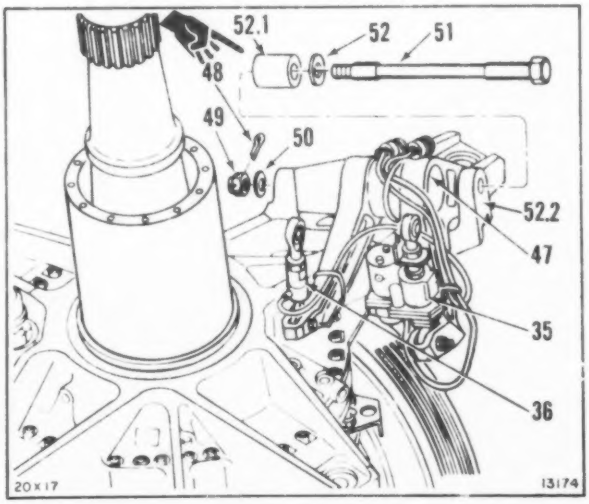
20X17
D145-2986-SPA

13. Remove cotter pin (48), nut (49), and washer (50) from shaft (51).
14. **Remove shaft (51)** and washer (52). Use an aluminum bar. Do not pry on shaft.

14.1. **Remove slider bushing (52.1)** from lug (52.2)

15. **Remove yoke (47)** with actuator (35) and link (36).


52.1
52
51
48
49
50
52.2
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35
36
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13174

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## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

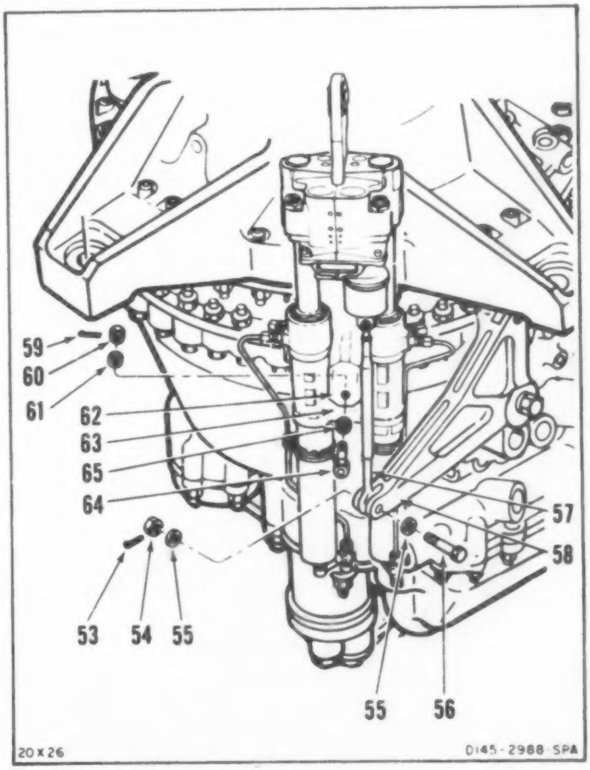
### *REMOVE SWIVELING SERVOCYLINDER*

16. Remove cotter pin (53), nut (54), two washers (55), and bolt (56) from lower end of link (57).
17. **Disconnect link (57)** from bellcrank (58).

**CAUTION**

**Do not bend tubes on servocylinder during removal.**

18. Remove cotter pin (59), nut (60), and washer (61) from back of lug (62).
19. Have helper support servocylinder (63). **Remove bolt (64)** and washer (65). **Lower and remove servocylinder** from lug (62).



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## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

*REMOVE PIVOTING SERVOCYLINDER*

20. **Remove** cotter pin (66), nut (67), two washers (68), and **bolt (69)** from lower end of link (70).

21. **Disconnect link (70)** from bellcrank (71).

**NOTE**

Check valves must be removed for clearance.

22. **Disconnect two tubes (72)** from check valves (73).

23. **Remove check valves (73)** from servocylinder (74).

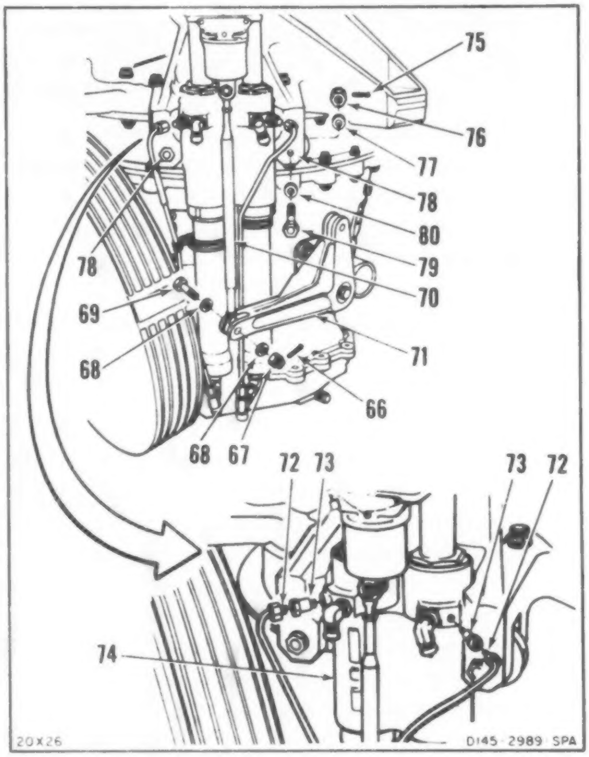
**CAUTION**

**Do not bend tubes on servocylinder during removal.**

24. Remove cotter pins (75), nuts (76) and washers (77) from back of two lugs (78).

25. Have helper support servocylinder (74). **Remove bolts (79)** and washers (80). **Lower and remove servocylinder** from lugs (78).

26. **Install check valves (73)** in servocylinder (74). Connect tubes (72) to check valves.



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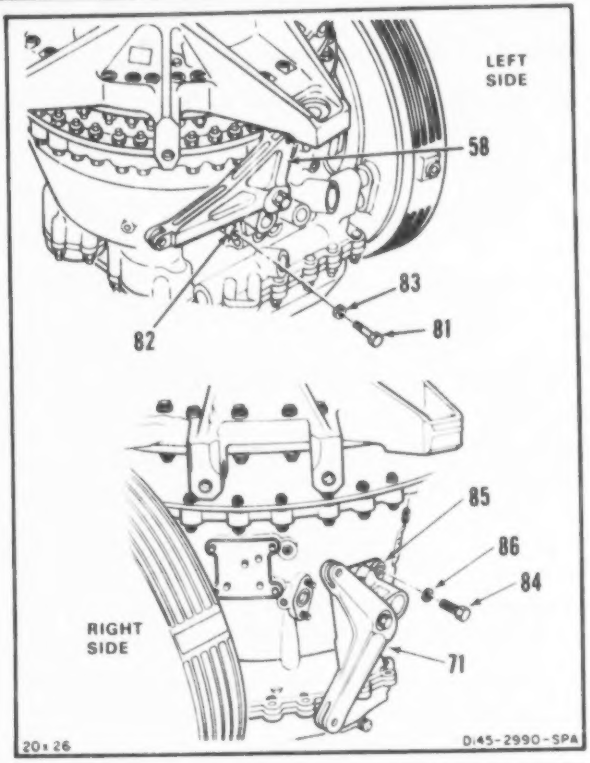
## 6-47 DISASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-47

### *REMOVE BELLCRANKS*

27. Remove lockwire from four bolts (81) on left bellcrank support (82). Remove bolts and washers (83). **Remove support and bellcrank (58).**

28. Remove lockwire from four bolts (84) on right bellcrank support (85). Remove bolts and washers (86). **Remove support and bellcrank (71).**



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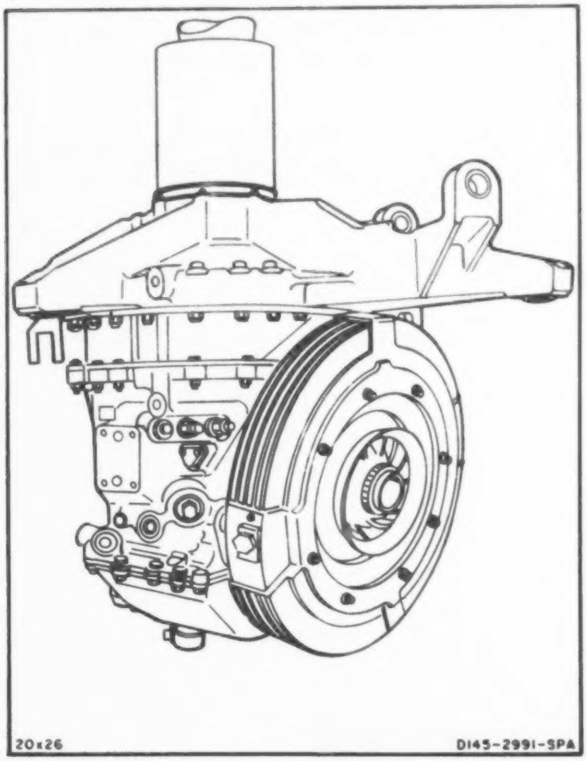

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FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-47.1 REPAIR FORWARD TRANSMISSION OUTSIDE SURFACE 6-47.1

INITIAL SETUP

*Applicable Configurations:*
All

*Tools:*
Dial Indicating Depth Gage 643J

*Materials:*
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

*Personnel Required:*
68D20 Aircraft Powertrain Repairer
68D30 Inspector

*References:*
TM 43-0103
MIL-C-5541
MIL-M-3171, Type VI
MIL-C-22751

*Equipment Condition:*
Off Helicopter Task

*General Safety Instructions:*

WARNING

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

WARNING

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

WARNING

**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

WARNING

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case or contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

CAUTION

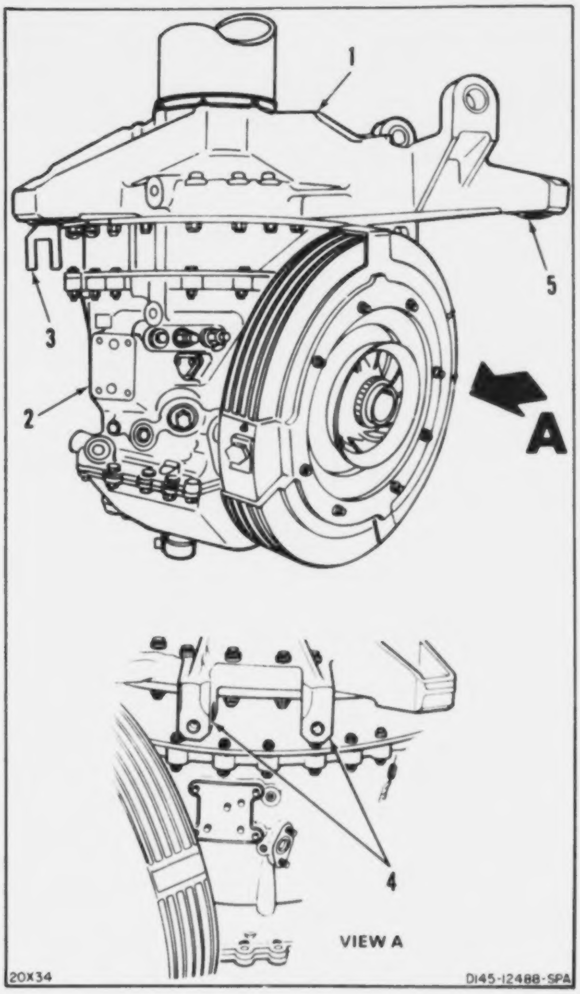
**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

*GO TO NEXT PAGE*

## 6-47.1 REPAIR FORWARD TRANSMISSION OUTSIDE SURFACE (Continued) 6-47.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.



1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cover (1) and housing (2):

   **NOTE**

   Refer to Task 6-35 for repairs to sump.

   **NOTE**

   Limits in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch. Depth of damage on actuator lugs (3 and 4) shall not be more than 0.015 inch.**

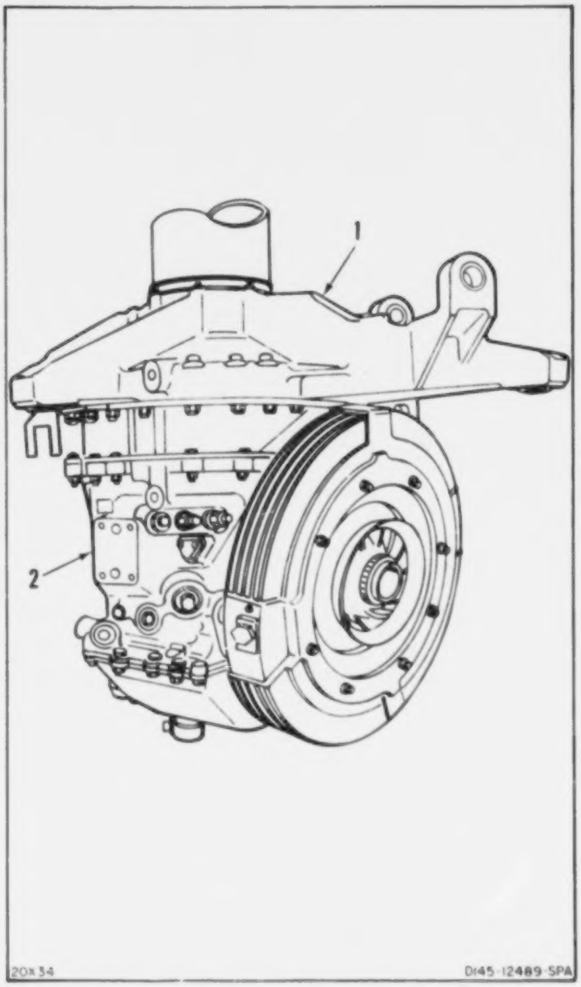
   b. **Damage shall not extend over more than one surface or enter any radius.**

   c. **Damage shall not be closer than 1.00 inch to any mounting hole (5).**
3. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) **There shall be no cracks.**
4. Cover moving parts near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.

*GO TO NEXT PAGE*

## 6-47.1 REPAIR FORWARD TRANSMISSION OUTSIDE SURFACE (Continued) 6-47.1

6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid etch reworked area** as follows:
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.
   b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths. Wear gloves (E186). Let area air dry.
   b. **If area is on cover (1), swab solution of alodine powder (E65) in water on area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry. Wear gloves (E186).
   c. **If area is on housing (2), swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry. Wear gloves (E186).
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours. Wear gloves (E186).
11. **Apply epoxy topcoat (E166)** (MIL-C-22751). Wear gloves (E186).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

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## 6-48 PREPARE FORWARD TRANSMISSION FOR SHIPMENT OR STORAGE 6-48

INITIAL SETUP

***Applicable Configurations:***
All

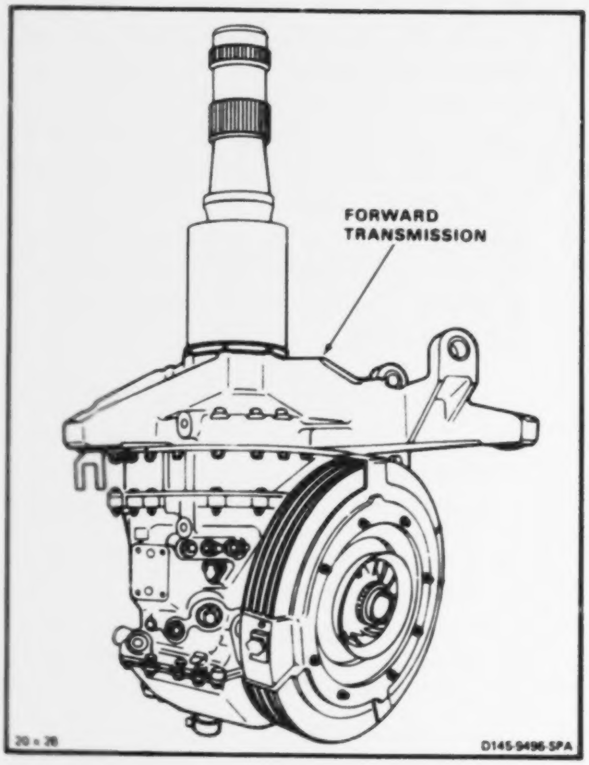
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist
Shipping Container (T74)
Container, 14-Quart (2)
Torque Wrench, 30 to 150 Foot-Pounds

***Materials:***
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Desiccant (E160), 16-Unit Bag (8)
Barrier Material (E81)
Tape (E388)

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***References:***
TB 55-8100-200-25
TM 38-750
TB 750-126

***Equipment Condition:***
Off Helicopter Task
Forward Transmission Disassembled (Task 6-47)



***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

*GO TO NEXT PAGE*

## 6-48 PREPARE FORWARD TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-48

**NOTE**

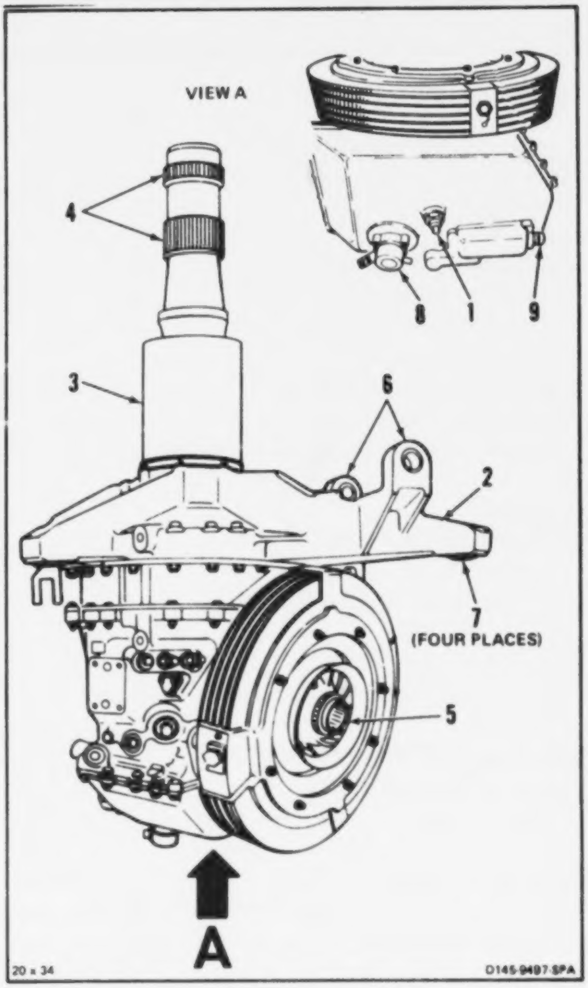
Sump holds about 28 quarts of oil.

1. Push in drain valve (1), twist it, and pull. **Let oil drain** into containers. Push in valve, twist it, and pull down to close.
2. Clean all surfaces of transmission (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
3. **Clean slider shaft (3),** rotor shaft **splines (4),** input shaft **splines (5) and bushings (6 and 7).** Use fingerprint remover (E175) and clean cloths (E120).

**CAUTION**

**Touching unpainted surfaces with bare fingers can cause corrosion.**

4. Put on gloves (E186). Gloves shall be worn for the rest of this task.
5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. **Coat slider shaft (3),** rotor shaft **splines (4),** input shaft **splines (5), and bushings (6 and 7)** with corrosion-preventive compound (E153 or E154). Use cloth (E120) to coat shaft. Use swabbing brush (E86) to coat splines and bushings.
7. **Cover slider shaft (3), splines (4 and 5), and bushings (6 and 7)** with barrier material (E81) and tape (E388).
8. **Cover indicating screen (8), electrical connectors (9) and drain valve (1)** with barrier material (E81) and tape (E388).



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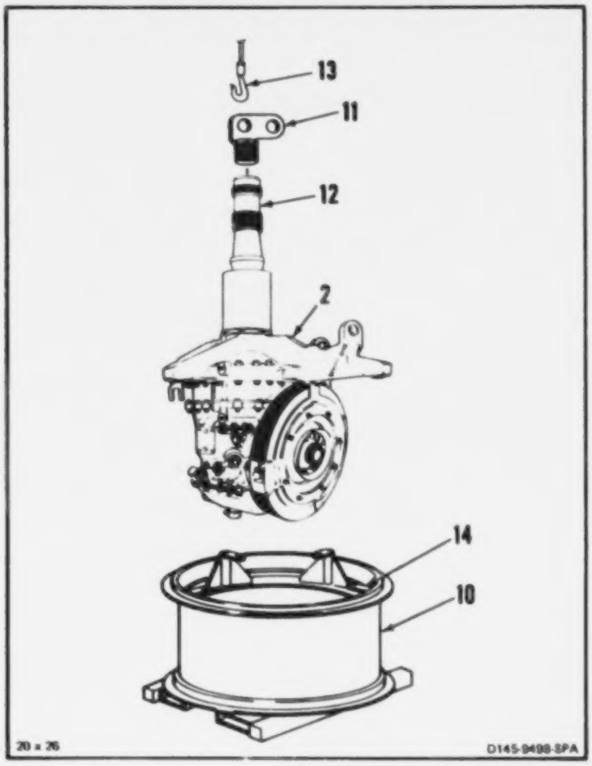
## 6-48 PREPARE FORWARD TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-48

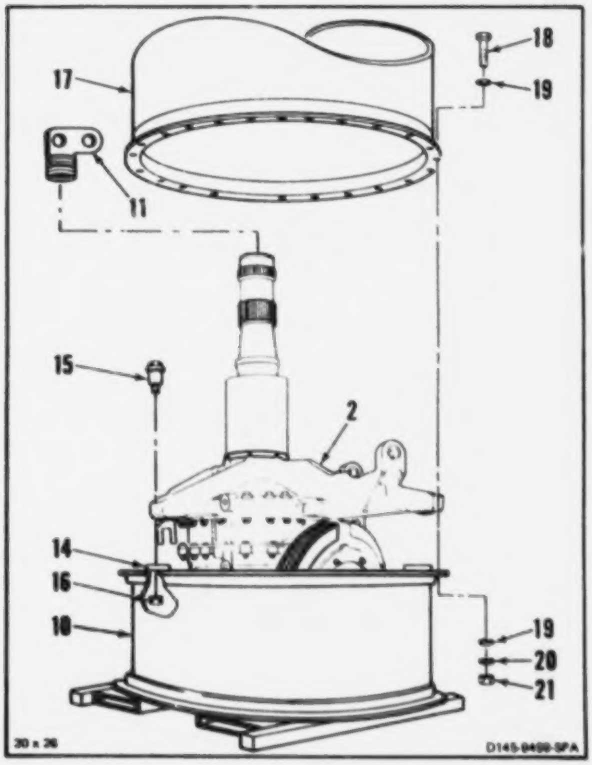
9. Install transmission (2) in shipping container (T74) (10) as follows:
   a. Inspect and prepare container (10) (TB 55-8100-200-25).
   b. Install hoisting eye (T32) (11) in top of shaft (12). Connect work hoist hook (13) to eye marked AFT SHAFT.
   c. With aid of helper, **place transmission (2) in container (T74) (10).** Align it with four mounting brackets (14).



   d. Remove hoisting eye (11) from transmission (2).
   e. **Secure transmission (2)** to container mounting brackets (14) with four bolts (15) and nuts (16). **Torque nuts to 55 foot-pounds.**
   f. Prepare required maintenance forms and records (TM 38-750 and TB 750-126).
   g. Put eight 16-unit bags of desiccant (E160) into container (10).

***INSPECT***

   h. Install cover (17) on container (10). Install bolts (18), washers (19), split washers (20), and nuts (21) at 24 places.
   i. **Tighten nuts (21) at 3, 6, 9, and 12 o'clock. Tighten nuts at 2, 4, 8, and 10 o'clock. Tighten remaining nuts.**



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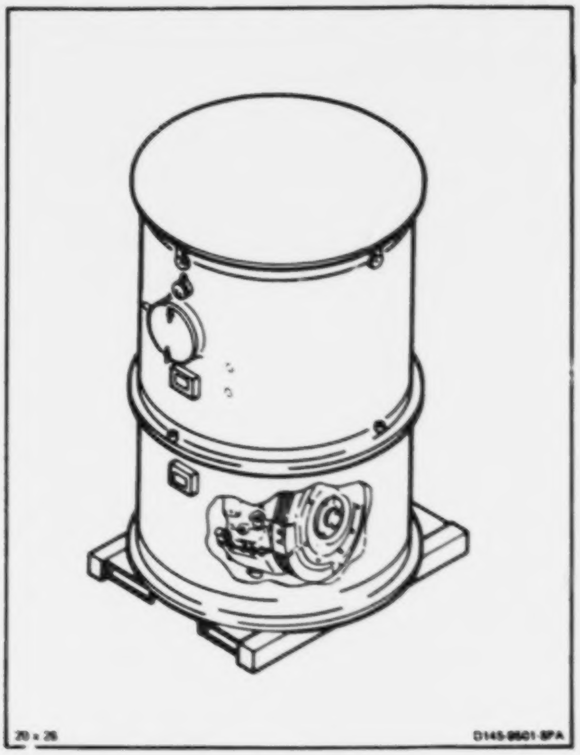
## 6-48 PREPARE FORWARD TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-48

FOLLOW-ON MAINTENANCE:

None


20 x 26
D145-8501-8PA

**END OF TASK**

## 6-49 REMOVE FORWARD TRANSMISSION FROM STORAGE 6-49

INITIAL SETUP

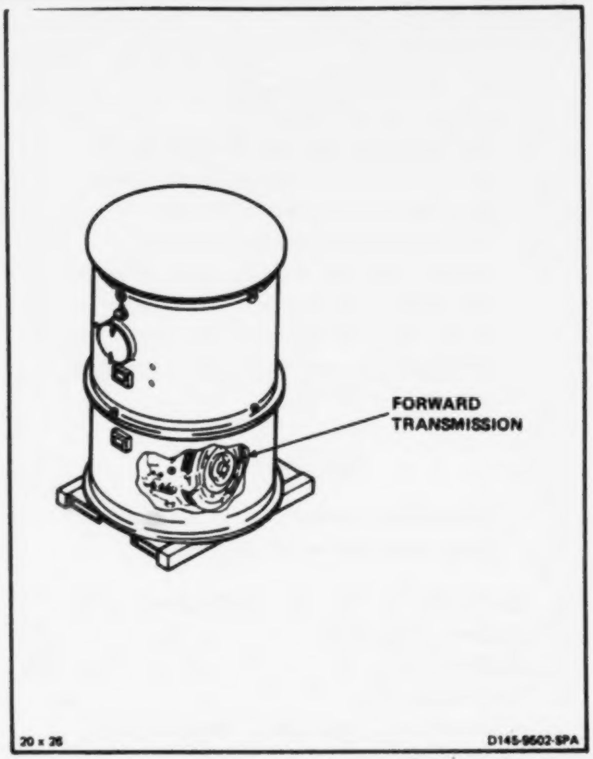
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist
Container, 14-Quart

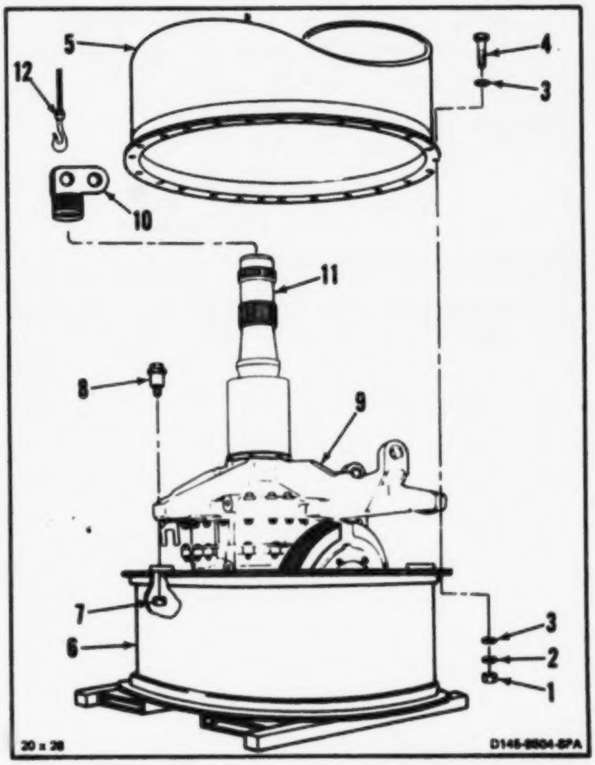
***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***Equipment Condition:***
Off Helicopter Task



1. **Remove 24 nuts (1) washers (2 and 3) and bolts (4)** from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. **Remove four nuts (7) and bolts (8)** from transmission (9).
4. **Install hoisting eye (T32) (10)** in rotor shaft (11). **Connect work hoist hook (12)** to eye marked AFT SHAFT.
5. With aid of helper, lift transmission (9) from container (6).
6. Set transmission (9) down on bench or workstand. Remove hoisting eye (T32) (10).
7. Install four bolts (8) and nuts (7) in container (6).
8. Install cover (5). Install 24 bolts (4), washers (3), split washers (2) and nuts (1).



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## 6-49 REMOVE FORWARD TRANSMISSION FROM STORAGE (Continued) 6-49

9. Remove all tape and barrier material from transmission (9).

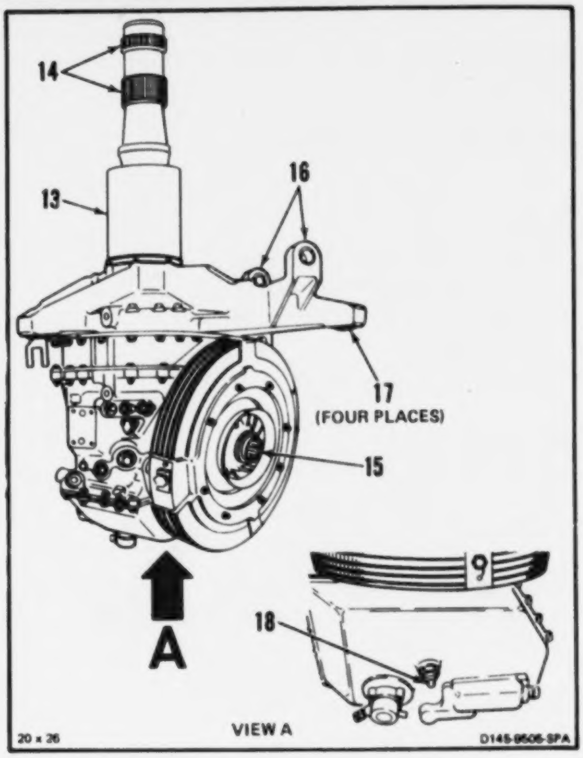
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Touching splines with bare fingers can cause corrosion.**

10. **Remove corrosion preventive compound from slider shaft (13),** rotor shaft **splines (14),** input shaft **splines (15), and bushings (16 and 17).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
11. **Push in drain valve (18), twist it, and pull.** Let residual oil drain into container. **Push in valve, twist it, and pull down to close.**



***INSPECT***

FOLLOW-ON MAINTENANCE:

Assemble forward transmission (Task 6-50).

**END OF TASK**

## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE 6-50

INITIAL SETUP

***Applicable Configurations:***
All

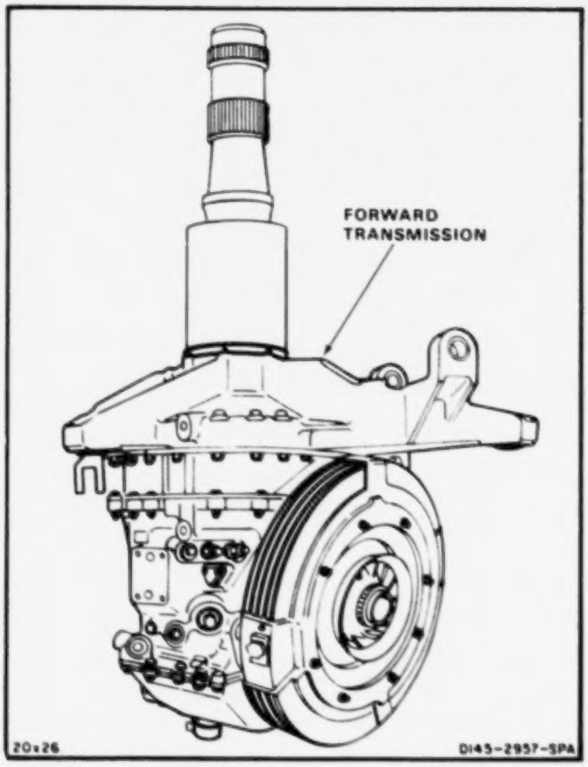
***Tools:***
- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Rotor Head Controls Sling (T14)
- Work Hoist
- Wrench, 1 1/16-Inch
- Wrench, 1 7/16-Inch
- Torque Wrench, 5 to 50 Inch-Pounds
- Torque Wrench, 30 to 150 Inch-Pounds
- Torque Wrench, 150 to 750 Inch-Pounds

***Materials:***
- Lockwire (231)
- Antiseize Compound (E75)

***Parts:***
- Cotter Pins

***Personnel Required:***
- 67U10 Medium Helicopter Repairer (2)
- 67U20 Medium Helicopter Repairer
- 67U30 Inspector

***References:***
- TM 55-1520-240-23P
- TM 55-1500-204-25/1
- Task 11-212



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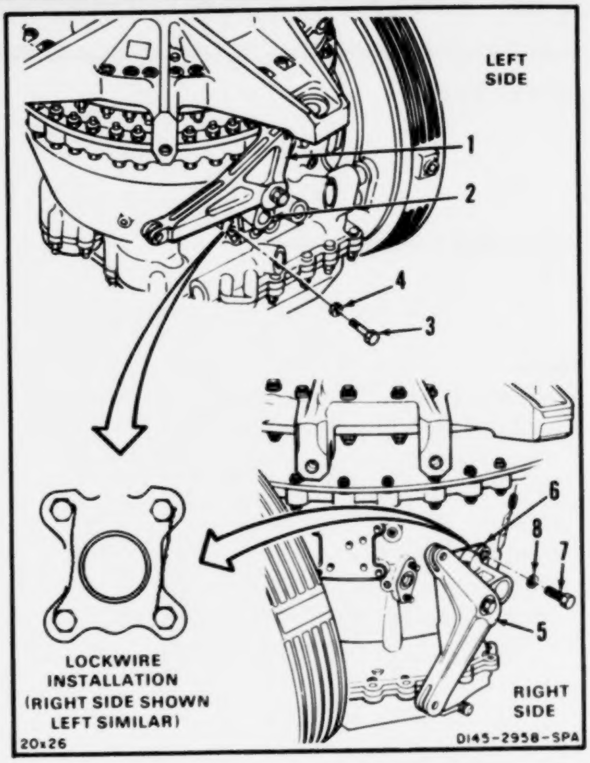
## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

### *INSTALL BELLCRANKS*

1. **Position left bellcrank (1)** and support (2).
2. **Install four bolts (3)** and washers (4). **Torque bolts to 190 inch-pounds.** Lockwire bolts on each side of support in pairs. Use lockwire (E231).
3. **Position right bellcrank (5)** and support (6).
4. **Install four bolts (7)** and washers (8). **Torque bolts to 190 inch-pounds .** Lockwire bolts on each side of support in pairs. Use lockwire (E231).


LEFT SIDE
1
2
4
3
6
8
7
5
LOCKWIRE INSTALLATION (RIGHT SIDE SHOWN LEFT SIMILAR)
RIGHT SIDE
20x26
D145-2958-SPA

### *INSTALL PIVOTING SERVOCYLINDER*

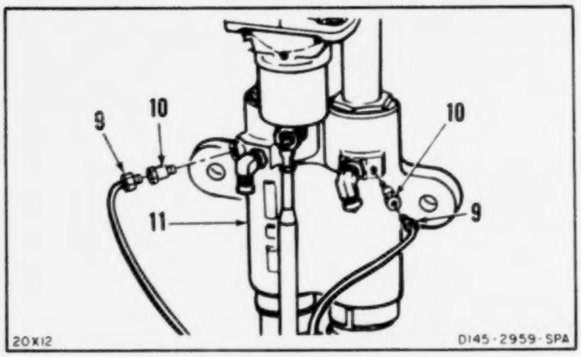
**CAUTION**

**Do not bend tubes on servocylinder during removal of check valves.**

**NOTE**

Check valves must be removed for clearance.

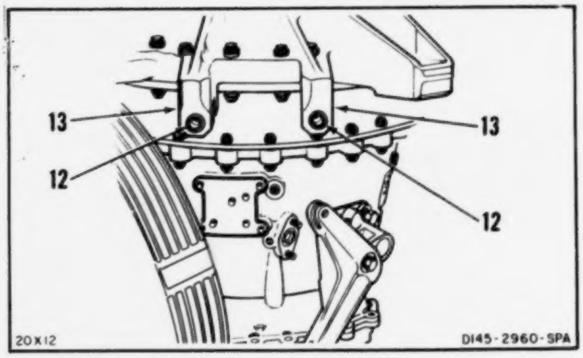
5. **Disconnect two tubes (9)** from check valves (10). **Remove check valves** from servocylinder (11).


9
10
10
11
9
20X12
D145-2959-SPA

**WARNING**

**If bushings are not installed, loss of helicopter, personal injury or loss of life can result.**

6. **Check that bushings (12) are securely installed in both inboard and outboard lugs (13). Check that bushings in outboard lugs do not protrude beyond inner or outer faces of lugs. If either one does, do not use transmission.**


13
13
12
12
20X12
D145-2960-SPA

*GO TO NEXT PAGE*

## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

7. Have helper **position servocylinder (11) between lugs (13).**

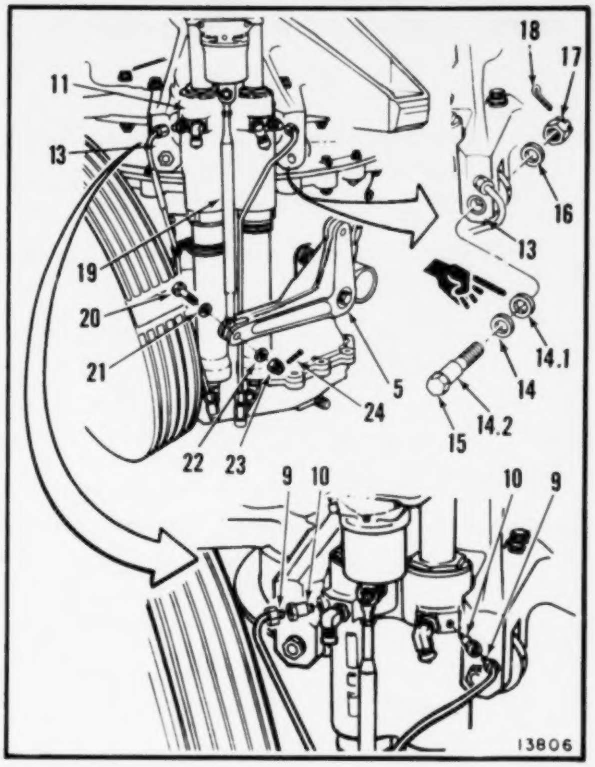
**WARNING**

**Make sure slip fit bushings are installed on shanks of bolts. Otherwise, personal injury, loss of life, or loss of helicopter can result.**

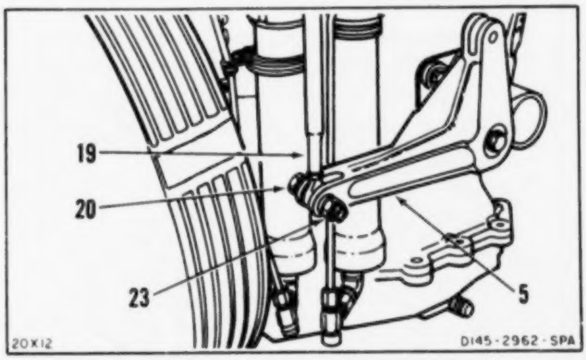
**NOTE**

- Install countersunk washers with countersink against bolthead.
- Two washers may be used under nut to install cotter pin.

8. **Check that countersunk washer (14), washer (14.1) and slip fit bushing (14.2) are installed** on shank of each bolt (15). **Install bolts** through lugs (13). **Install** one or two washers (16) and **nut (17)** on each bolt.
9. **Torque bolts (15) to 320 to 720 inch-pounds.** Install cotter pins (18).
10. **Install two check valves (10). Connect tubes (9)** to valves.
11. **Position link (19)** in bellcrank (5).
12. **Install bolt (20),** head inboard, steel washer (21) under bolt head, aluminum washer (22), and nut (23). **Torque nut to 30 to 45 inch-pounds.** Install cotter pin (24).



13. **Check link (19) and bellcrank (5).** There shall be no axial looseness between them.
14. **Check bolt (20) and nut (23). Torque needed to turn bolt and nut shall be at least 10 inch-pounds.**



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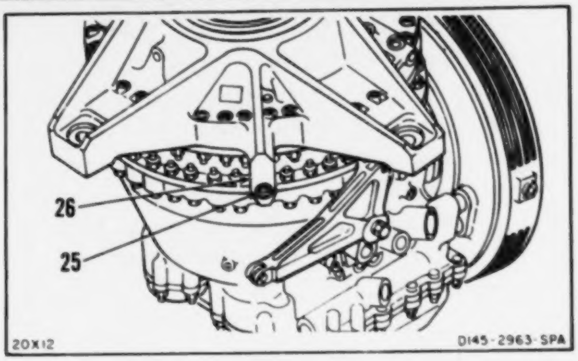
## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

***INSTALL SWIVELING SERVOCYLINDER***

**WARNING**

**If slip bushing is not installed, loss of helicopter, personal injury or loss of life can result.**

15. **Check that bushings (25) are installed in lugs (26).**



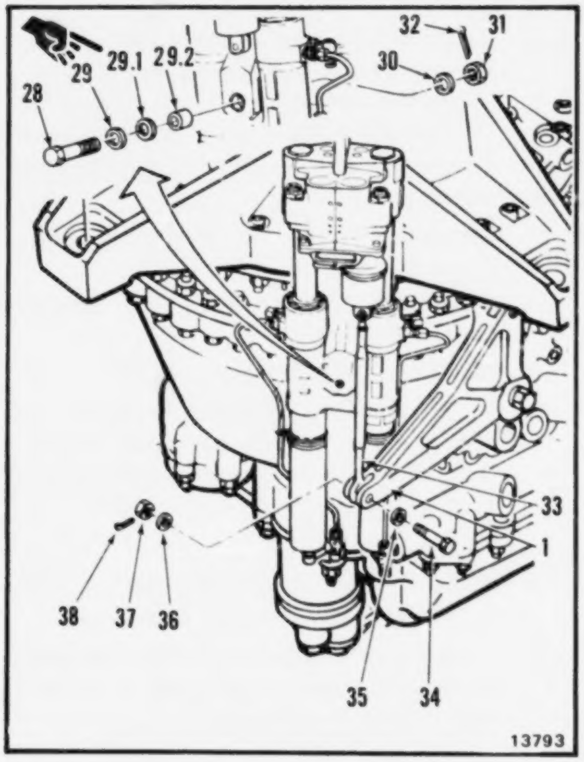
**NOTE**

- Two washers may be installed under nut to allow for cotter pin installation.
- Install countersunk washers with countersink against bolthead.

16. Have helper **position servocylinder (27)** in lug (26).
17. **Install bolt (28) with countersunk washer (29), washer (29.1) and slip bushing (29.2)** through lugs (26). Install one or two washers (30) and nut (31) on bolt.

17.1. **Torque bolt (28) to 320 to 720 inch-pounds.** Install cotter pin (32).

18. **Position link (33)** in bellcrank (1).
19. **Install bolt (34),** head outboard, steel washer (35) under bolthead, aluminum washer (36), and nut (37). **Torque nut to 30 to 45 inch-pounds.** Install cotter pin (38).



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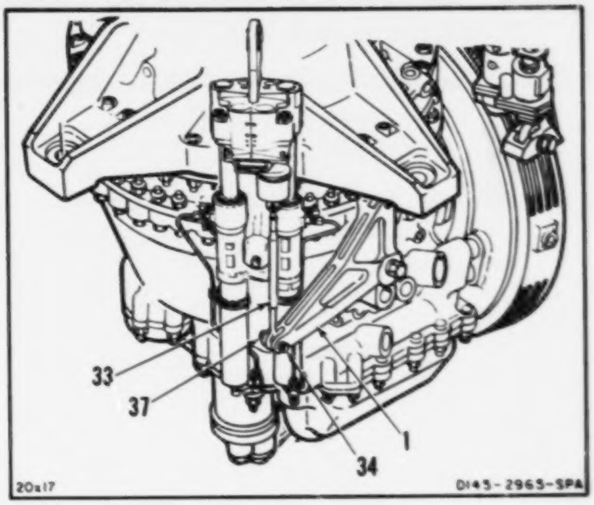
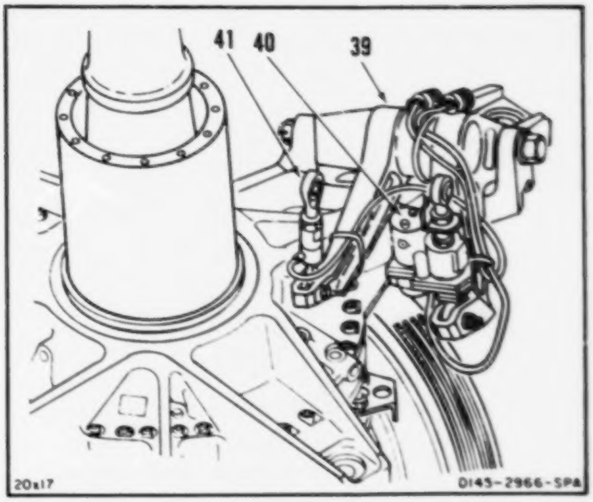
20. **Check link (33) and bellcrank (1).** There shall be no axial looseness between them.
21. **Check bolt (34) and nut (37). Torque needed to turn bolt and nut shall be at least 10 inch-pounds.**


33
37
1
34
20x17
D145-2965-SPA

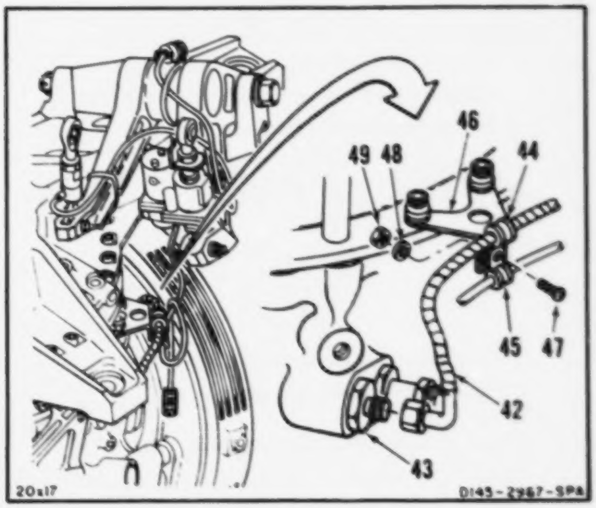
*INSTALL YOKE*

22. **Install yoke (39)** with actuator (40) and link (41) (Task 11-217).


41
40
39
20x17
D145-2966-SPA

*INSTALL TRANSDUCER OIL HOSE*

23. **Connect oil hose (42)** to reducer (43).
24. **Connect hose clamp (44) and cable clamp (45)** to bracket (46). Install screw (47), washer (48), and nut (49).


46
49
48
44
45
47
42
43
20x17
D145-2967-SPA

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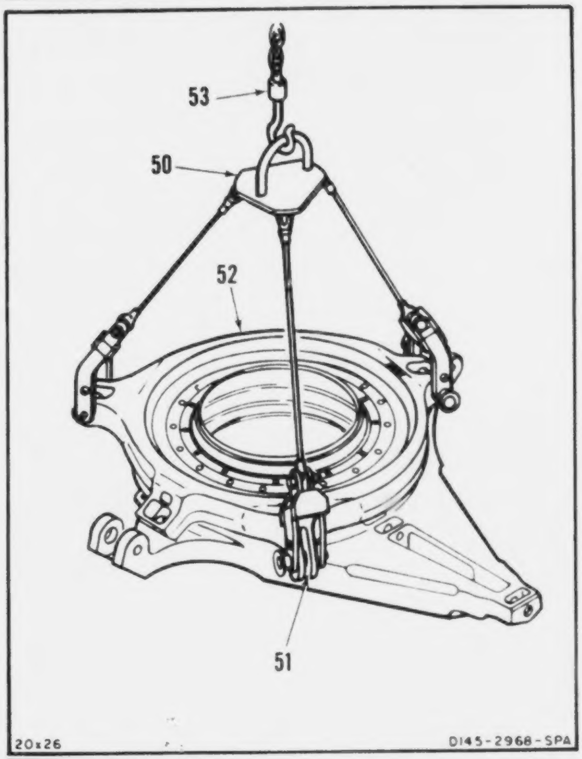
## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

*INSTALL SWASHPLATE*

25. **Attach sling (T14) (50)** to three lugs (51) on swashplate (52). **Attach work hoist chain (53)** to sling (T14).



**WARNING**

**Swashplate is heavy and can injure personnel if it drops. Swashplate must be supported by hoist and moved carefully to prevent injury to personnel.**

**CAUTION**

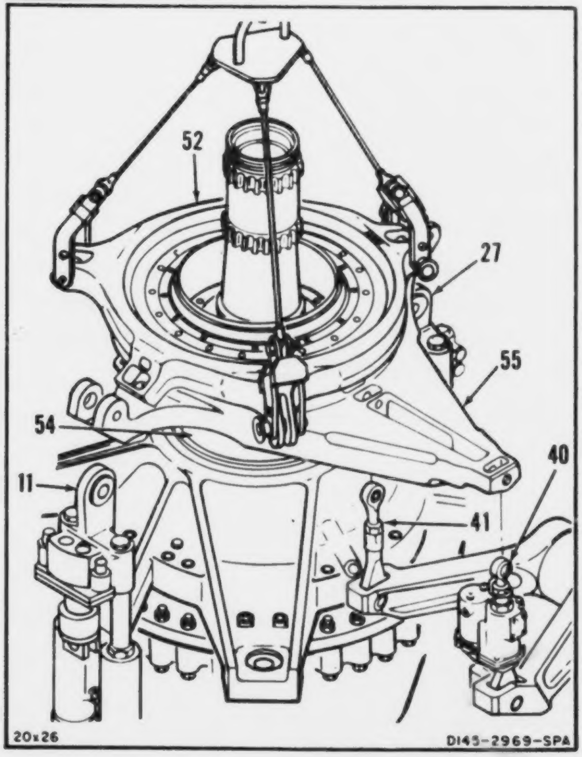
**If swashplate hits or binds on slider shaft, shaft or swashplate bearings can be damaged.**

26. **Have helper lower swashplate (52)** over slider shaft (54). Do not let swashplate hit or bind on shaft.

**CAUTION**

**If actuator or link are twisted, they can be damaged.**

27. **Align lower ring (55)** with actuator (40), link (41), and two servocylinders (11 and 27). Do not twist actuator or link.



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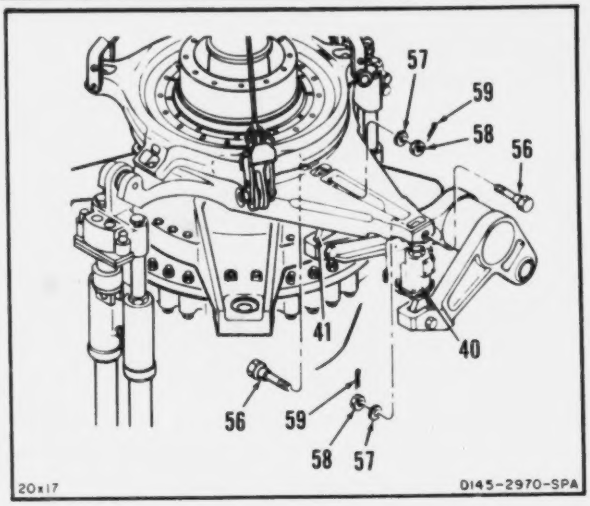
## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

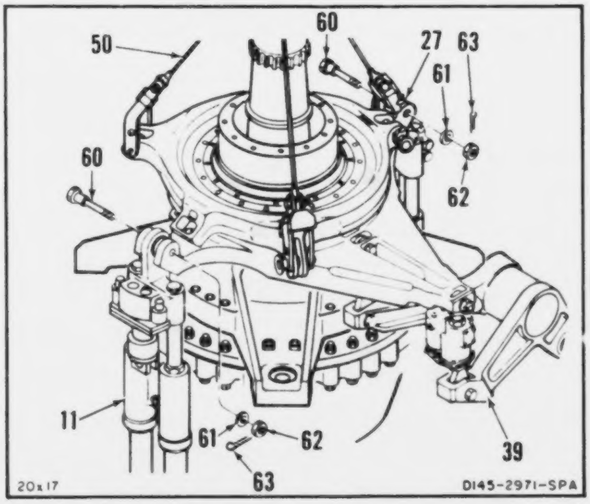
CAUTION

**Using standard bolts could result in bolt failure. Damage to parts can result.**

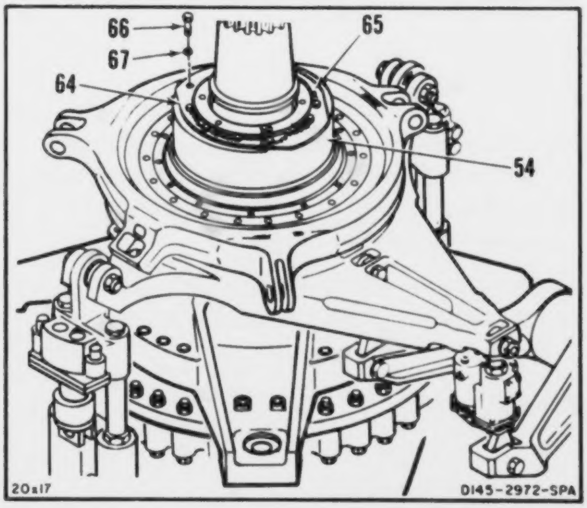
28. Coat bushing of special bolts (56) with anti-seize compound (E75). Do not coat thread.
29. **Install two special bolts (56),** with heads away from each other, washers (57), and nuts (58) through upper ends of actuator (40) and link (41). **Torque nuts to 290 to 660 inch-pounds.** Add one or two washers if needed to align cotter pin (59). Install cotter pin.


57
59
58
56
41
40
56
59
58
57
20x17
D145-2970-SPA

30. Coat bushing of special bolts (60) with anti-seize compound (E75). Do not coat thread.
31. **Install two special bolts (60), heads away from yoke (39), washers (61), and nuts (62)** in servocylinders (11 and 27). **Torque nuts to 290 to 660 inch-pounds.** Add one or two washers if needed to align cotter pin (63). Install cotter pin.
32. Remove sling (T14) (50).


60
50
27
63
61
60
62
11
61
62
63
39
20x17
D145-2971-SPA

33. **Position seal halves (64 and 65)** on shaft (54). **Install 12 bolts (66)** and washers (67). **Torque bolts to 60 inch-pounds.**
34. Lockwire six bolts (66) on each half of seal (64) together in pairs of three. Use lockwire (E231).


66
67
65
64
54
20x17
D145-2972-SPA

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## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

### *INSTALL COVER, LINKS, AND DRIVE ARMS*

**CAUTION**

**If arm hits slider shaft, shaft can be damaged.**

35. Have two helpers **lower cover (68),** with lower drive arm (69) and three links (70) attached, **over rotor shaft (71).** Do not let drive arm hit slider shaft (54).

36. **Position drive arm (69)** in swashplate lug (72) marked FWD ROTOR. **Position three links (70)** in lugs (73).

37. **Install each of three links (70)** as follows:
    a. Coat bushing of bolt (74) with antiseize compound (E75). Do not coat thread.
    b. Install limiter (75) between link (70) and lug (73), flat side against lug.
    c. Install bolt (74), washer (76), and nut (77). **Install nut to 290 to 660 inch-pounds.** Install cotter pin (78).

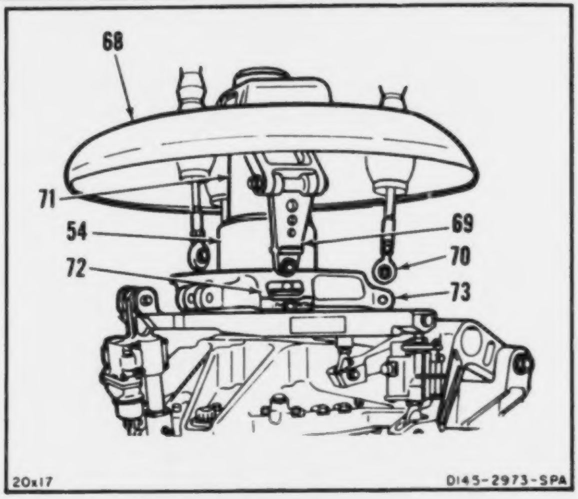
38. **Check that bushing (79) is installed in lug (72).**

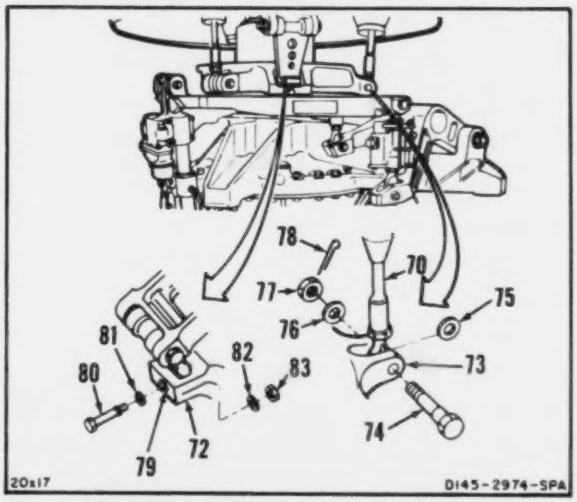
39. **Install bolt (80),** thin washer (81), washer (82) and nut (83). **Torque nut to 80 to 150 inch-pounds above friction torque** (TM 55-1500-204-25/1).

40. **Check clearance between end of bolt (80) and inside of lug (72).** Clearance shall be at least 0.005 inch. Add washers (81) under bolt head as needed.

41. Install cotter pin (84) in bolt (80). Lockwire bolt to hole in right side of lug (72). Use lockwire (E231).

### *INSPECT*


68
71
54
72
69
70
73
20x17
D145-2973-SPA


78
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81
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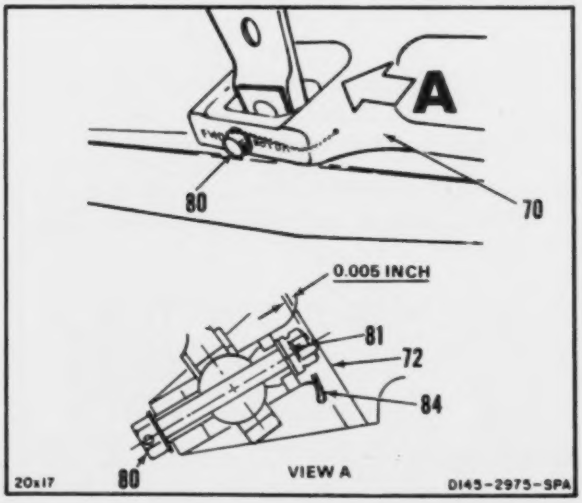
82
83
74
72
79
20x17
D145-2974-SPA


A
80
70
0.005 INCH
81
72
84
80
VIEW A
20x17
D145-2975-SPA

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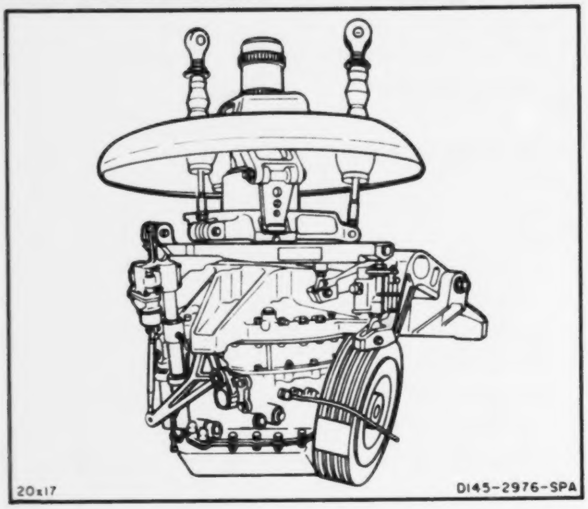
## 6-50 ASSEMBLE FORWARD TRANSMISSION PACKAGE (Continued) 6-50

FOLLOW-ON MAINTENANCE:

Inspect servocylinders (Task 7-123).
Install rotary-wing head (Task 5-9).



**END OF TASK**

## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE 6-51

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Hoisting Eye (T32)
- Work Hoist
- Torque Multiplier, SWE-101, 3/4-Inch Drive
- Socket, 1 7/16-Inch
- Breaker Bar, 3/4-Inch Drive, At Least 36 Inches Long
- Open End Wrench, 1-Inch
- Rope Guide Lines
- Torque Wrench, 5 to 50 Inch-Pounds
- Torque Wrench, 30 to 150 Inch-Pounds
- Torque Wrench, 150 to 750 Foot-Pounds

***Materials:***

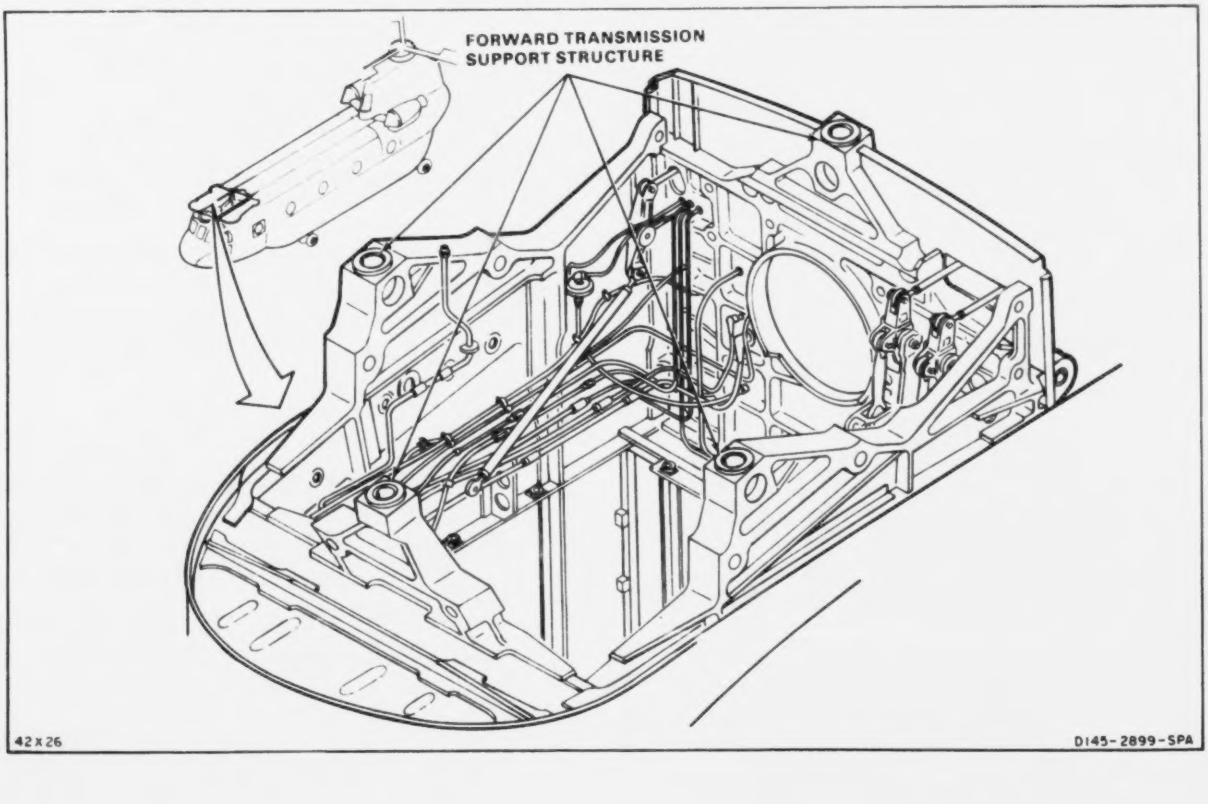
- Lockwire (E229)
- Grease (E190)

***Personnel Required:***

- 67U10 Medium Helicopter Repairer (2)
- 67U20 Medium Helicopter Repairer
- 67U30 Inspector

***References:***

TM 55-1520-240-23P



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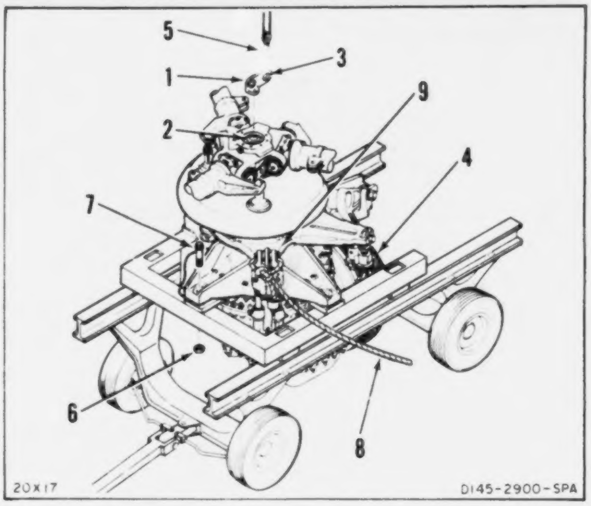
## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

### *MOUNT TRANSMISSION*

**NOTE**

Hoisting eye must trail aft to keep transmission at proper angle for installation.

1. **Install hoisting eye (T32) (1)** in shaft (2) so that FWD XMSN hole (3) points toward oil cooler (4).
2. **Connect work hoist (5)** to FWD XMSN hole (3) of hoisting eye (T32) (1).
3. Remove three nuts (6) and bolts (7).
4. Attach two rope guide lines (8) to transmission (9).



**WARNING**

**Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.**

5. Raise transmission (9) and center it over support structure (10). Check that hoisting eye (T32) (1) points aft. Have helpers guide transmission with guide lines (8).

**NOTE**

While lowering transmission, turn it as needed for clearance.

6. Carefully lower transmission (9). Have helpers **align mounting hole (11)** in each of four lugs (12) with hole (13) in structure (10). Keep lugs about 1 inch off structure.

**NOTE**

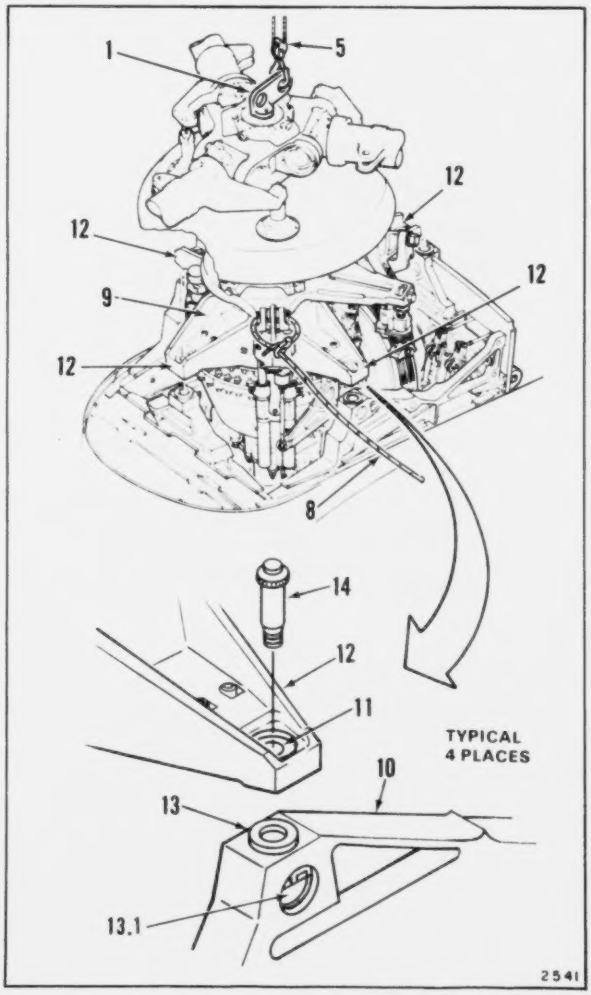
Refer to task 1-13, para 8, for re-use of barrel nuts.

7. Coat shank and thread of four mounting bolts (14) with grease (E190). **Install four mounting bolts** in mounting holes (11). Use bolts as guide pins to center holes (11) in lugs (12) with holes (13) and barrel nut (13.1) in structure (10).

**CAUTION**

**Do not force bolts. If bolts cannot be installed by hand, transmission and structure are not aligned. Bolts can be damaged.**

8. Have helpers **tighten each bolt (14) at least 3 turns** by hand while slowly lowering transmission (9). Shift transmission as needed for alignment. When bolts are tight, relax tension on hoist (5). Remove lines (8).



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## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

***TORQUE BOLTS***

**NOTE**

Socket assembly, torque applicator, and reactor are part of torque reactor assembly (T159).

9. **Torque left bolt (14) as follows:**
   a. **Install socket assembly (14.1)** on left bolt (14).
   b. **Install torque applicator (15)** over square drive of socket assembly (14.1) **with large hole aft** of assembly. Observe THIS SIDE UP stamping on applicator.
   c. **Install sleeve (15.1) on aft end of applicator (15).** Insert two pins (15.2) through sleeve and adapter.
   d. **Install aft end of sleeve (15.1) in center block (15.3)** of reactor (16). **Install socket** at end of reactor on aft bolt (16.1).
   e. **Install pin (16.2)** through center block (15.3) and applicator (15).
   f. **Set ratchet selector (16.3)** at bottom of torque pack (T23) (16.4) **to NUT ON.**
   g. Install torque pack (T23) (16.4) on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into two holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

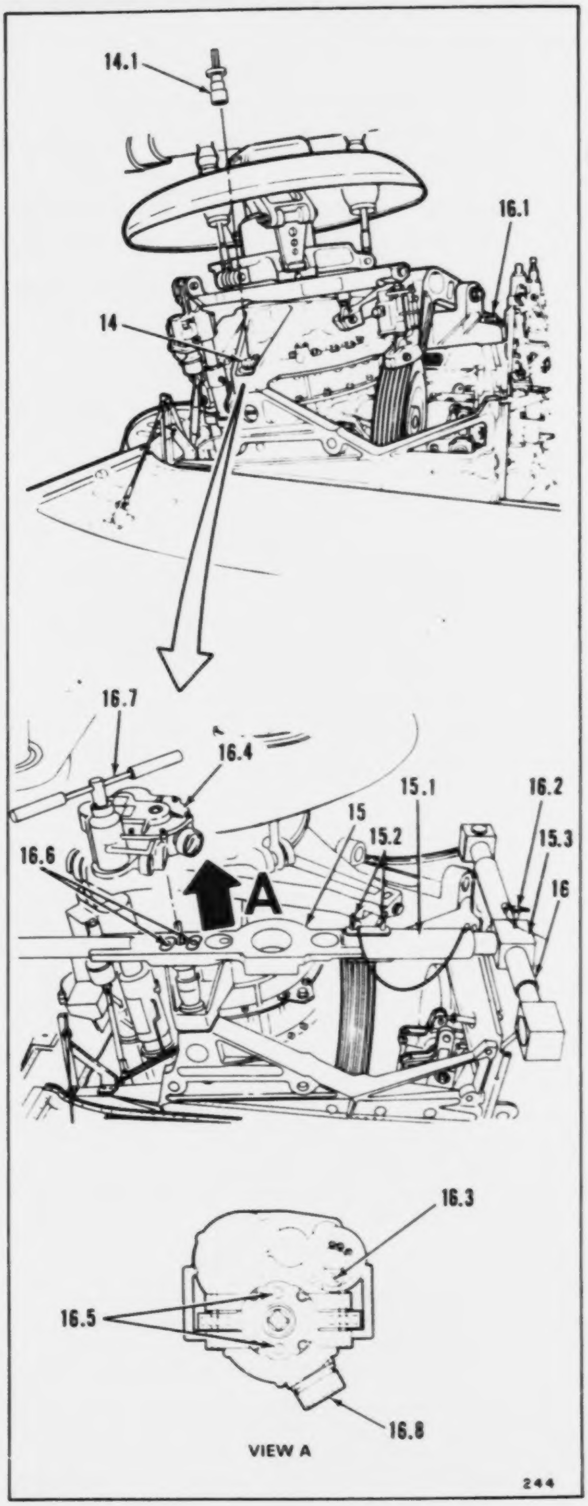
**WARNING**

**Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

   h. Set tee handle (T161) (16.7) to ON. Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.
   i. Set tee handle (T161) (16.7) to OFF. Turn handle counterclockwise until indicator (16.8) reads 0. Check that torque pack (T23) (16.4) is loose on bolt (14).
   j. Remove torque pack (16.4) and torque reactor assembly (T159).
   k. Remove sleeve (15.1) from applicator (15).



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## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

9.1. Torque aft bolt (16.1) as follows:

a. **Install socket assembly (14.1)** on aft bolt (16.1).

b. **Install torque applicator (15)** over square drive of socket assembly (14.1) **with large hole at left of assembly.** Observe THIS SIDE UP stamping on applicator.

c. **Install left end of applicator (15) in end block (16.9) of reactor (16). Install socket** at end of reactor **on left bolt (14).**

d. **Install pin (16.2)** through end block (16.9) and applicator (15).

e. **Check that ratchet selector (15.4)** on torque pack (T23) (16.4) **is set to NUT ON.**

f. **Install torque pack (T23) (16.4)** on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use handle (T161) (16.7).

**WARNING**

**Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

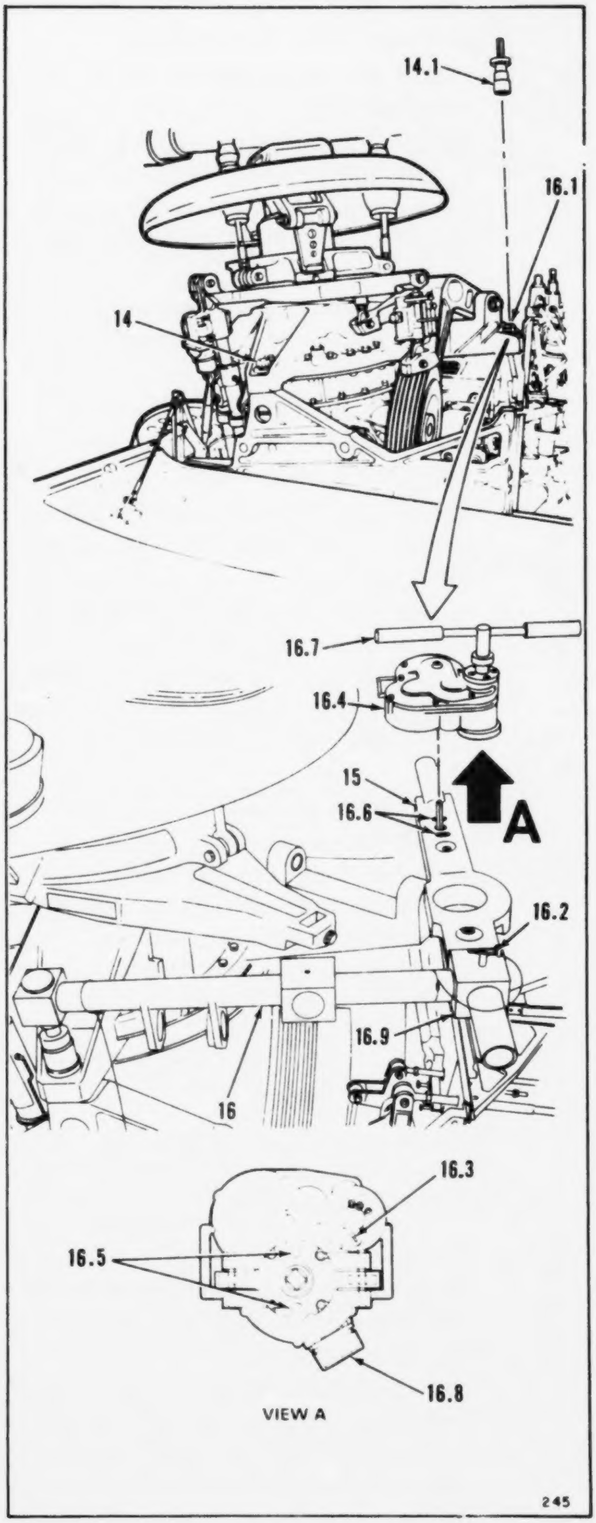
**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

g. Set tee handle (T161) (16.7) to ON. **Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.**

h. Set tee handle (T161) (16.7) to OFF. **Turn handle (16.7) counterclockwise until indicator (16.8) reads 0 .** Check that torque pack (T23) (16.4) is loose on bolt (16.1).

i. Remove torque pack (16.4) and torque reactor assembly (T159).



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## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

9.2. Torque right bolt (17) as follows:

a. **Install socket assembly (14.1)** on right bolt (17).

b. **Install torque applicator (15)** over square drive of socket assembly (14.1) **with large hole forward of assembly.** Observe THIS SIDE UP stamping on applicator.

c. **Install forward end of applicator (15) in center block (15.3) of reactor (16). Install socket** at end of reactor **on forward bolt (18).**

d. **Install pin (16.2)** through center block (15.3) and applicator (15).

e. **Check that ratchet selector (16.3)** on torque pack (T23) (16.4) **is set to NUT ON.**

f. **Install torque pack (T23) (16.4)** on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

**WARNING**

**Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

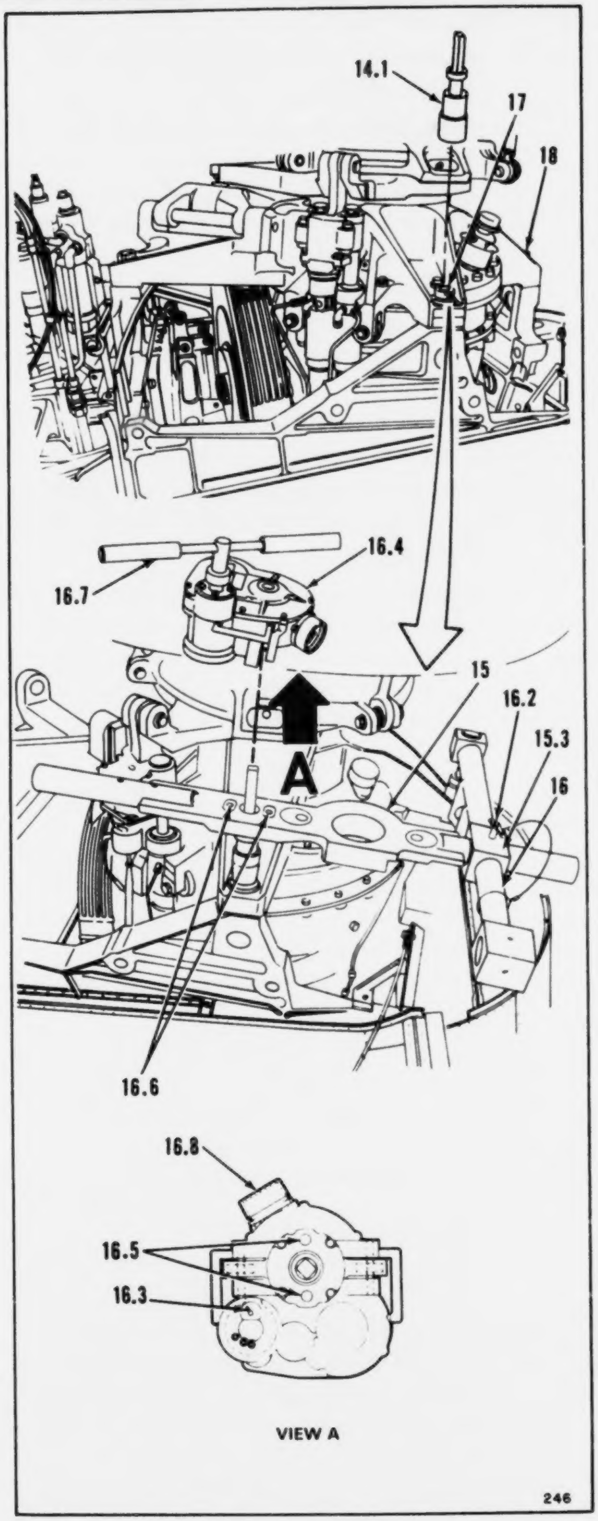
**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

g. Set tee handle (T161) (16.7) to ON. **Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.**

h. Set tee handle (T161) (16.7) to OFF. **Turn handle counterclockwise until indicator (16.8) reads 0.** Check that torque pack (T23) (16.4) is loose on bolt (17).

i. Remove torque pack (16.4) and torque reactor assembly (T159).



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## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

9.3. Torque forward bolt (18) as follows:

a. **Install socket assembly (14.1)** on forward bolt (18).

b. **Install torque applicator (15)** over square drive of socket assembly (14.1) **with large hole at right of assembly.** Observe THIS SIDE UP stamping on applicator.

c. **Install right end of applicator (15) in center block (15.1) of reactor (16). Install socket** at end of reactor **on right bolt (17).**

d. **Install pin (16.2)** through center block (15.3) and applicator (15).

e. **Check that ratchet selector (16.3)** on torque pack (T23) (16.4) **is set to NUT ON.**

f. **Install torque pack (T23) (16.4)** on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

**WARNING**

**Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

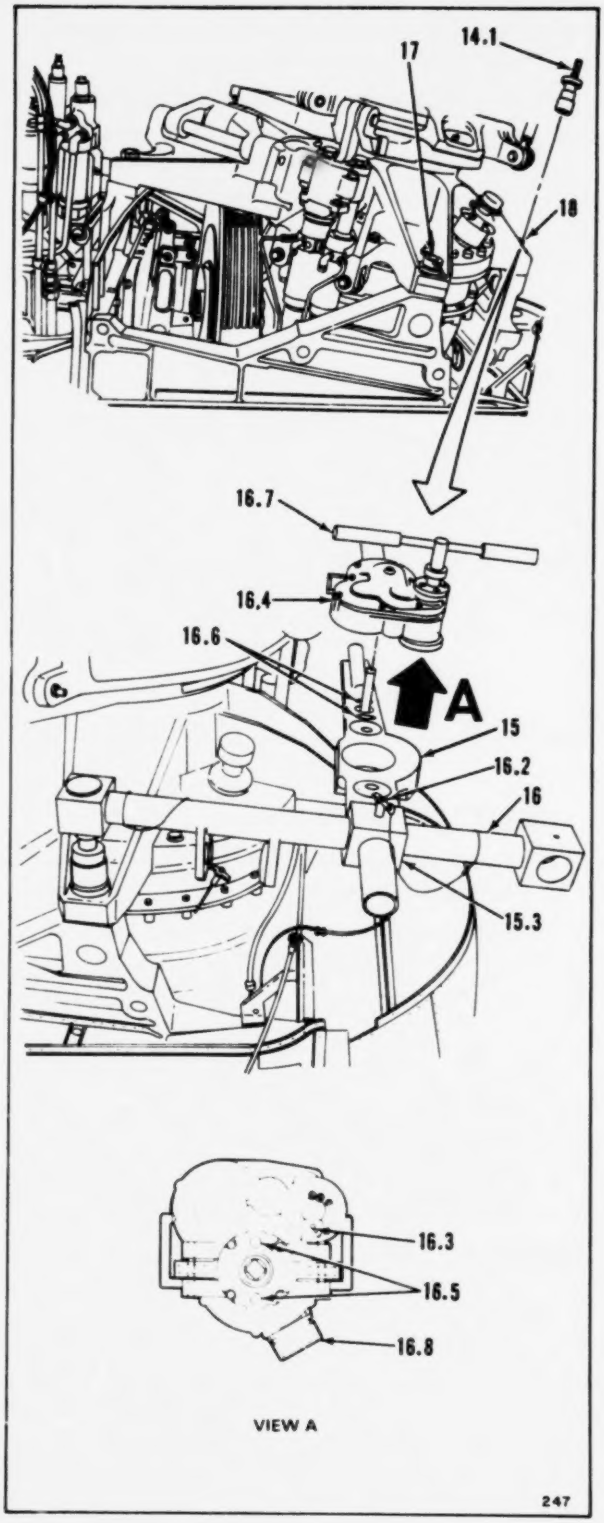
**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

g. Set tee handle (T161) (16.7) to ON. **Turn handle clockwise until indicator (16.8) reads 885 foot-pounds.**

h. Set tee handle (T161) (16.7) to OFF. **Turn handle counterclockwise until indicator (16.8) reads 0.** Check that torque pack (T23) (16.4) is loose on bolt (18).

i. Remove torque pack (16.4) and torque reactor assembly (T159).



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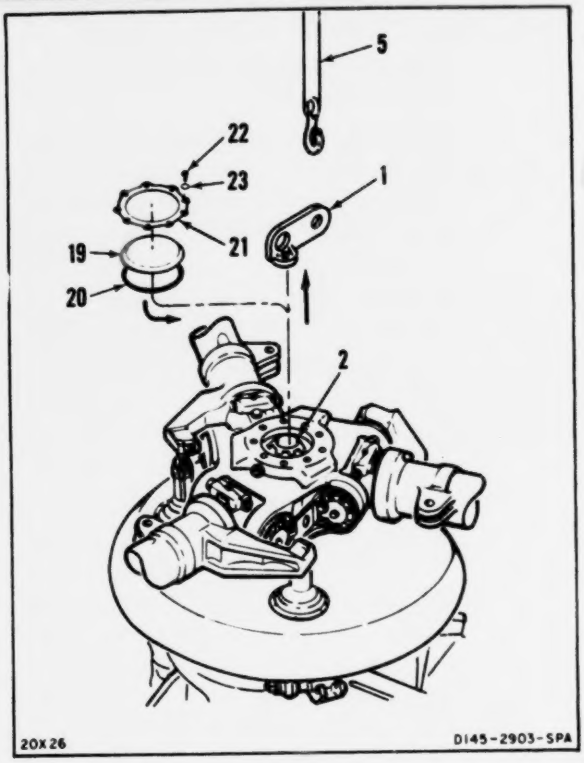
## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

10. Remove work hoist hook (5) from hoisting eye (T32) (1). Remove eye.
11. **Position hub nut cover (19),** packing (20) and retainer (21) over shaft (2). **Install nine screws (22)** and washers (23). **Torque screws to 20 inch-pounds.**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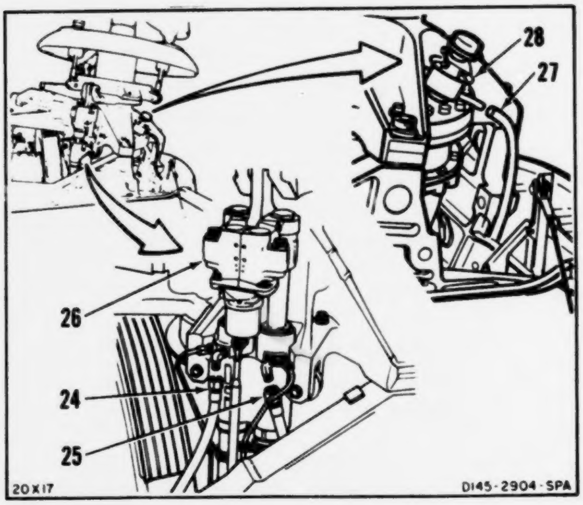
***CONNECT UPPER POINTS***

12. **Connect hoses (24 and 25)** to right servocylinder (26).
13. **Connect hose (27)** to oil drain cup (28).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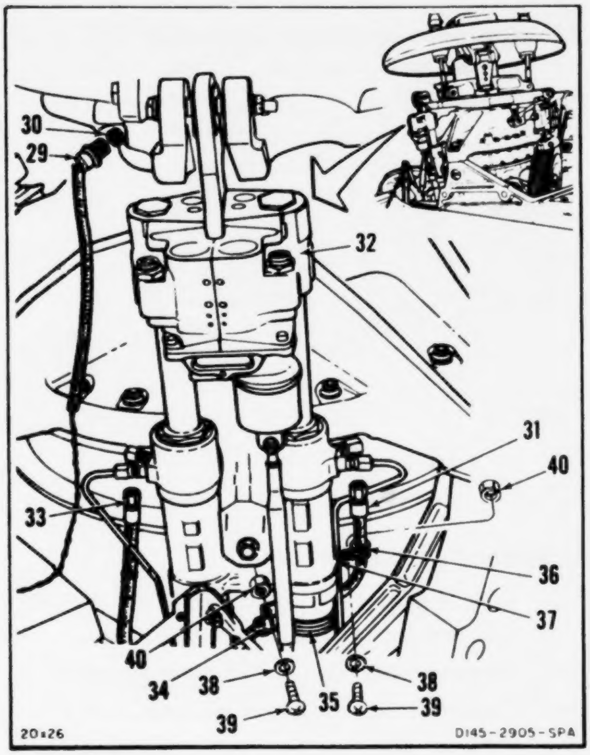
## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

14. **Connect electrical connector (29)** to phase detector (30). Lockwire connector to detector. Use lockwire (E229).
15. Pass hose (31) behind right side of left servocylinder (32) as shown. **Connect hoses (31 and 33) to left servocylinder.**
16. **Clamp hose (31)** to servocylinder (32) by connecting clamp (34) to clamp (35) and clamp (36) to clamp (37). Use two screws (38), washers (39), and nuts (40).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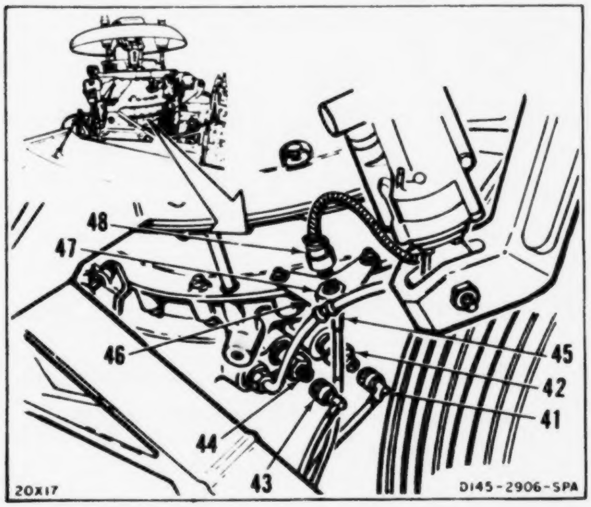
D145-2905-SPA

17. **Connect electrical connector (41)** to AUX PRESS SW (42). Remove tag.
18. **Connect electrical connector (43)** to MAIN PRESS SW (44). Remove tag.
19. **Install electrical connector (45)** on bracket (46) from underneath. Secure with nut (47). Lockwire nut to bracket with lockwire (E229).
20. **Connect electrical connector (48)** to connector (45) at bracket (46).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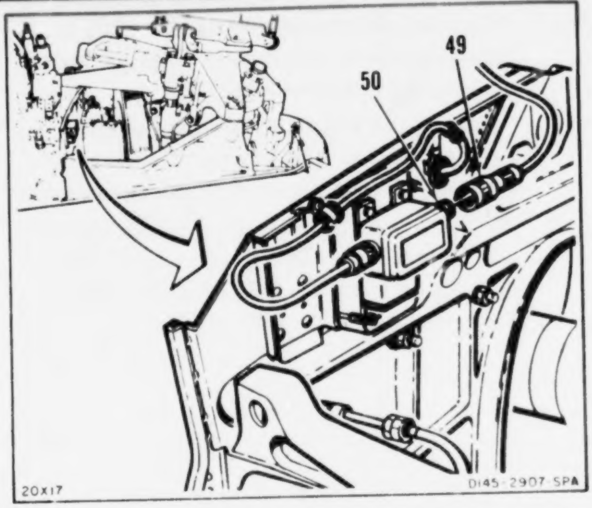
## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

21. **Connect electrical connector (49)** to signal conditioner (50).


49
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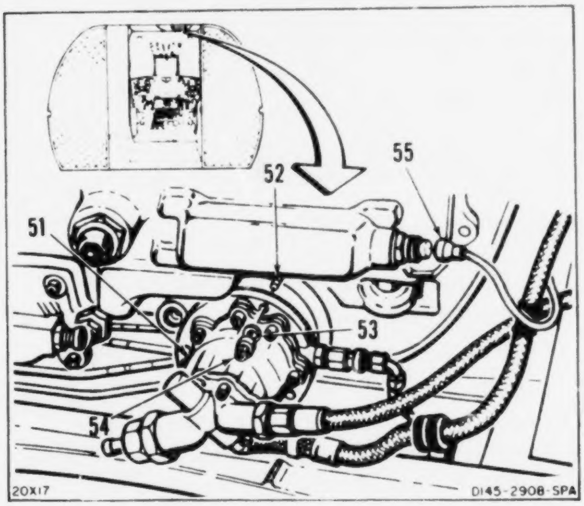
20X17
D145-2907-SPA

### *CONNECT LOWER POINTS*

22. **Install pump (51)** over four studs (52). Install washers (53) and nuts (54).
23. **Torque nuts (54) to 85 inch-pounds.**
24. **Connect oil temperature connector (55).**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20X17
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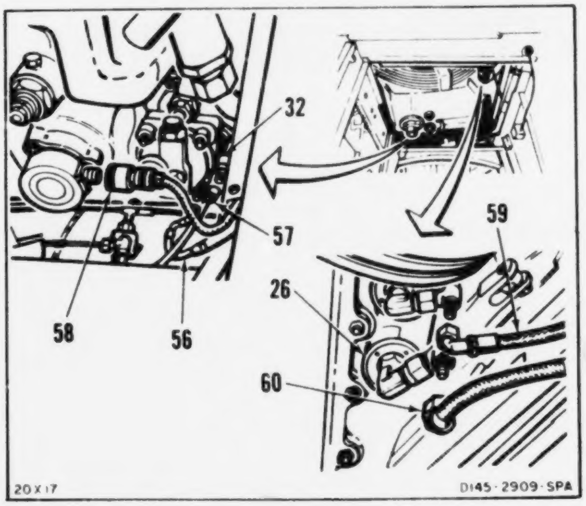
25. **Connect hoses (56 and 57)** to left servocylinder (32).
26. **Connect chip detector connector (58).**
27. **Connect hoses (59 and 60)** to right servocylinder (26).

### *INSPECT*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## 6-51 INSTALL FORWARD TRANSMISSION PACKAGE (Continued) 6-51

FOLLOW-ON MAINTENANCE:

Install forward connecting links (Task 11-195).

Install forward transmission adapter assembly (Task 6-8).

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).

Install forward transmission oil cooler air inlet duct (Task 6-122).

Install forward transmission fairing (Task 2-67 and 2-68).

Install rotary-wing blades (Task 5-84).

Service transmission (Task 1-54).

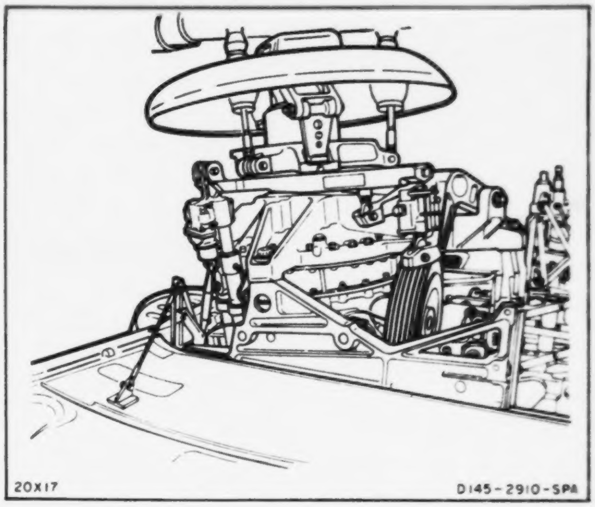
Perform ground run (TM 55-1520-240-10).

Install forward transmission drip pan (Task 2-3).

Perform neutral rig check (Task 11-33).

Bleed flight control hydraulic system (Task 7-16).

Perform after-maintenance special inspection (Task 1-92).



**END OF TASK**

# SECTION IV
# AFT ROTARY-WING DRIVE SHAFT

## 6-52 REMOVE AFT SLIDER SHAFT 6-52

INITIAL SETUP

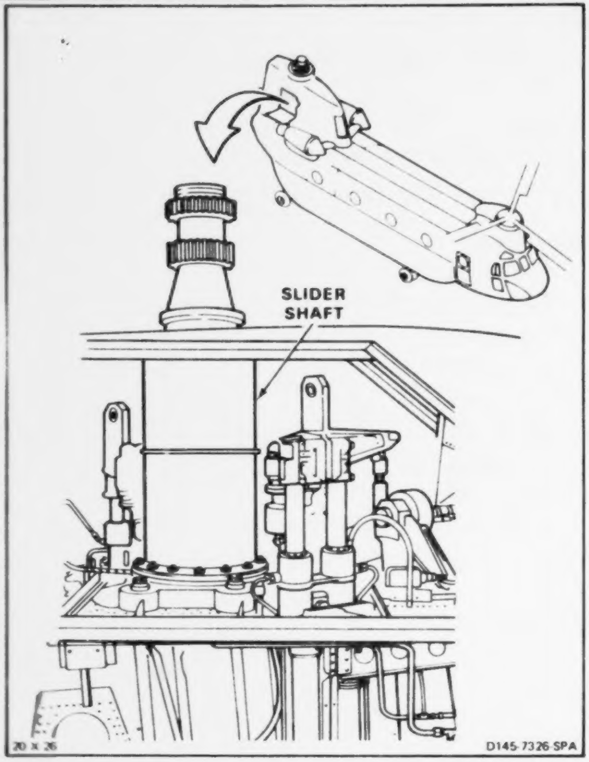
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Barrier Material (E81)
Tape (E388)

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Work Platforms Open (Task 2-2)
Aft Rotary-Wing Blades Removed (Task 5-64)
Aft Rotary-Wing Head Removed (Task 5-8)
Aft Weather-Protective Cover Removed (Task 5-136)
Aft Drive Collar Removed (Task 5-100)
Aft Drive Arms Removed (Task 5-101)
Aft Swashplate Removed (Task 5-117)



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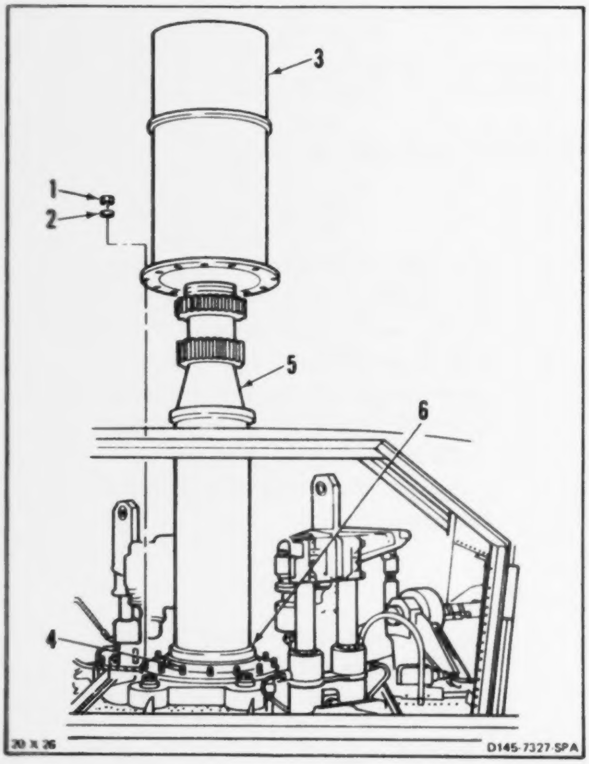
1. **Remove 16 nuts (1)** and washers (2) from base of slider shaft (3).

**CAUTION**

**Handle slider shaft carefully. Polished surface is easily damaged.**

2. Lift slider shaft (3) from support (4). Strike side of slider shaft with hand or soft-faced mallet while lifting as needed to loosen shaft. **Remove shaft** from aft rotor shaft (5).
3. Cover exposed seal (6) with barrier material (E81) and tape (E388).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-52.1 REPAIR AFT SLIDER SHAFT

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Gage 643J

***Materials:***
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Alodine Power (E65)
Zinc Chromate Primer (E291)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer
68D30 Inspector

***References:***
TM 43-0103
MIL-C-5541

***Equipment Condition:***
Off Helicopter Task

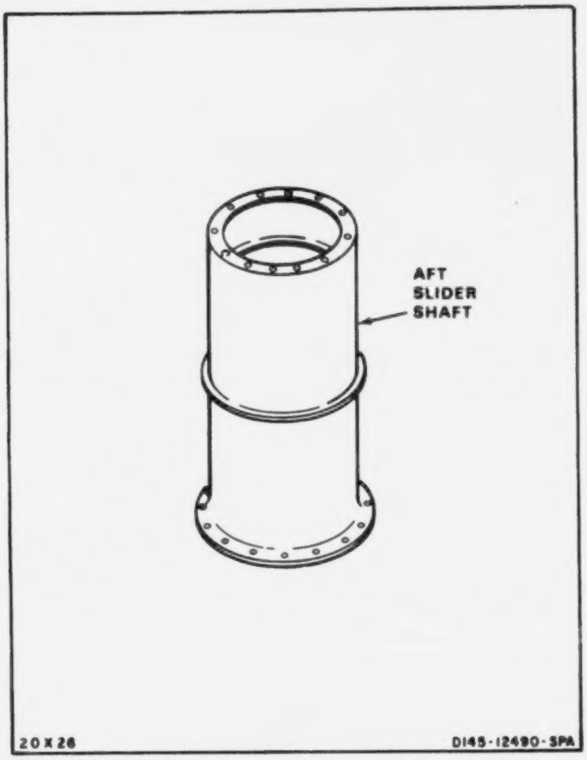
***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**



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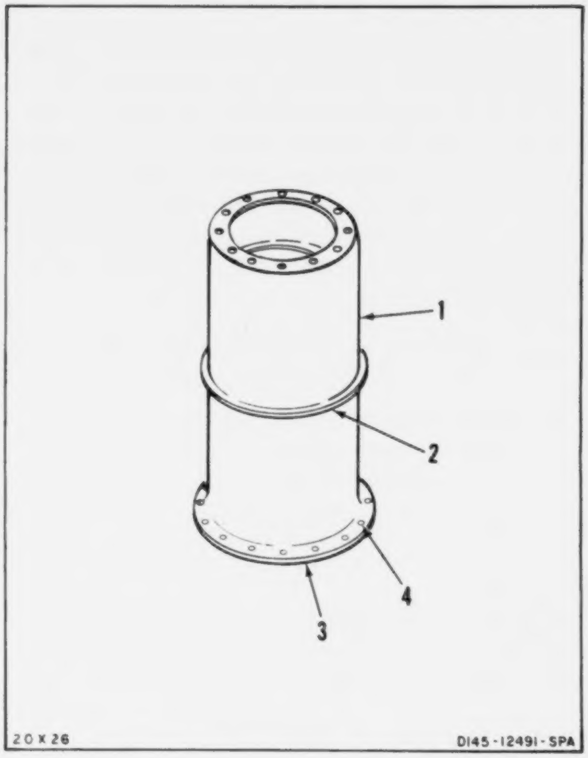
## 6-52.1 REPAIR AFT SLIDER SHAFT (Continued) 6-52.1

1. **Clean** oil and grease from **slider shaft (1).** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Inspect surface of slider shaft (1)** for nicks, scratches, and minor pitting or corrosion of coating. Observe the following definitions:
   a. Nick — A surface indentation with a sharp crease at the bottom. Surface finish is not broken. Caused by pressure or impact from a hard object with a sharp edge.
   b. Scratch — A light, narrow mark on the surface. Surface finish is broken, but not removed. Caused by a hard, sharp particle moving across the surface.
   c. Pit — A small irregular cavity where material is removed from the surface. Usually caused by corrosion. Pits are usually dark in appearance.
   d. Corrosion — A broken or pitted surface, discolored around the edge. Corrosion is caused by chemical action.
3. Note extent and location of damage:

**NOTE**

Limits in this step refer to depth of damage after rework.

   a. **Depth of damage above flange (2) (bearing surface) shall not be more than 0.020 inch. Depth of damage below flange shall not be more than 0.025 inch.**
   b. **Damage shall not extend from shaft surface to mounting flange (3).**
   c. **Damage on mounting flange (3) shall not be closer than 1.00 inch to any mounting hole (4).**



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## 6-52.1 REPAIR AFT SLIDER SHAFT (Continued) 6-52.1

   d. **Sum of length plus width of any one damaged area shall not be more than 1 1/4 inches.**

   e. **Distance between two damaged areas shall not be less than half the length of the larger area.**

   f. **In that part of shaft (1) above flange (2), there shall be no more than 20 damaged areas in any 3/4 inch wide band (5) around shaft (1). There shall be no more than five damaged areas in any quarter-section of the band. The total of length plus width of all five areas shall not be more than 5 1/2 inches.**

   g. **There shall be no more than 75 damaged areas over entire shaft (1).**

4. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) **There shall be no cracks.**
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 3.
6. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid-etch reworked area** as follows:

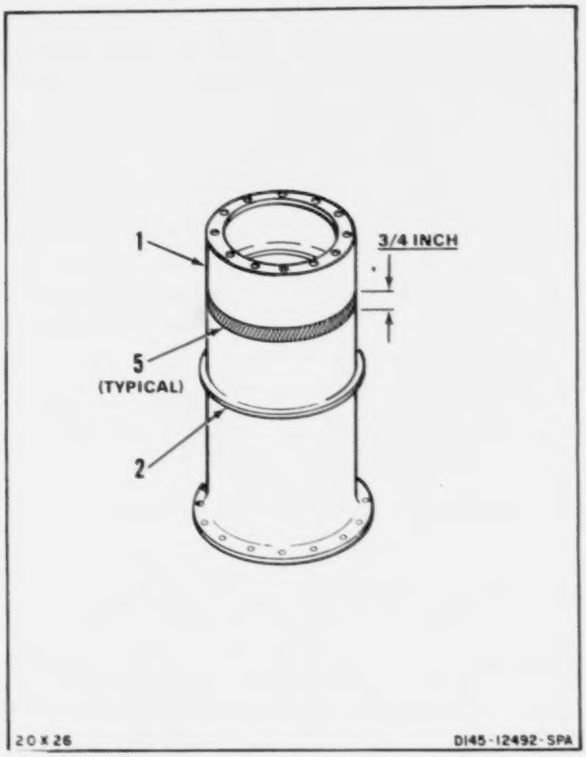
**WARNING**

**Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

   a. **Prepare solution of 3 parts acetic acid (E21) to 7 parts water.** Wear gloves (E186) and goggles.

   b. **Swab area with solution for 2 minutes.** Use gauze sponges (E184).

   c. **Rinse** area with cold water.



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## 6-52.1 REPAIR AFT SLIDER SHAFT (Continued) 6-52.1

8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. Clean area with naphtha (E245) and clean cloths (E120). Let area air dry. Wear gloves (E186).

**WARNING**

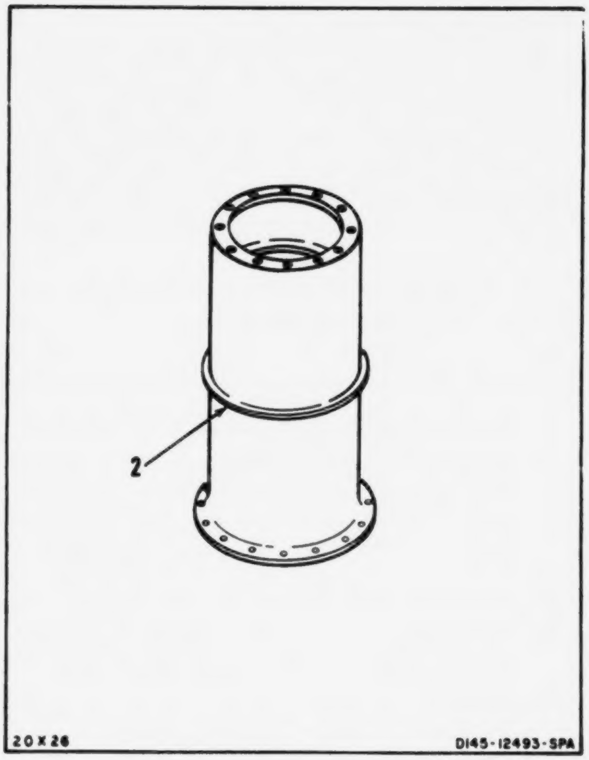
**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

   b. **Swab solution of alodine powder (E65) in water on area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184). Wear gloves (E186).
   c. **Rinse** area with cold water. Let air dry.

**WARNING**

**Zinc chromate primer (E291) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

   d. If reworked area is below flange (2), apply zinc chromate primer (E291). Wear gloves (E186).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-53 REMOVE AFT ROTOR SHAFT UPPER SEAL (AVIM) 6-53

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Work Hoist
Hoisting Eye (T32)
Wood Plank, 2 Inches x 4 Inches x 36 Inches
Phenolic Wedge
Kevlar Gloves (E187)
Gun Heater
Pyrometer

***Materials:***
None

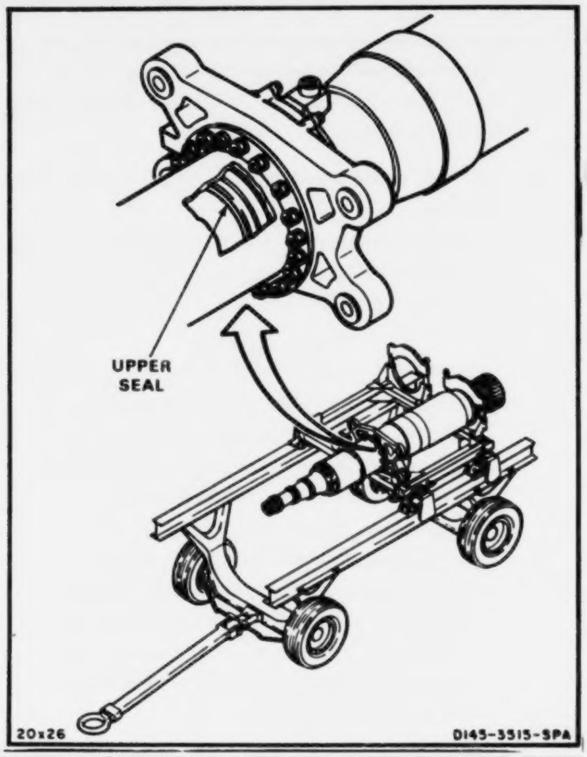
***Personnel Required:***
Medium Helicopter Repairer
Aircraft Powertrain Repairer

***Equipment Condition:***
Off Helicopter Task
Aft Rotor Shaft Installed Horizontally In Adapter (T18)

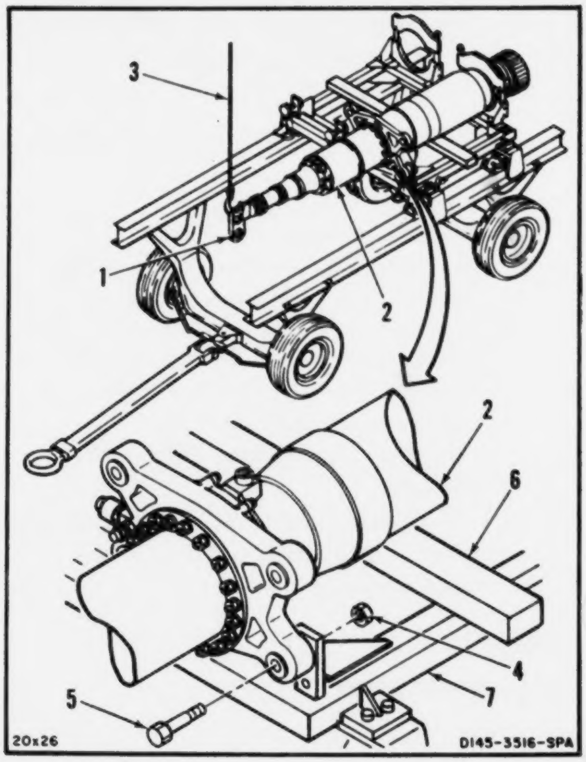
***General Safety Instructions:***

**WARNING**

**Wear Kevlar gloves when handling heated parts.**



1. **Install hoisting eye (T32) (1)** in shaft (2).
2. **Connect hoist cable (3)** to eye of hoisting eye (T32) (1) marked AFT SHAFT. Have helper raise hoist to remove slack from cable.
3. **Remove two** nuts (4) and **bolts (5).**
4. Have helper lift shaft (2) enough to **insert wood plank (6) between shaft and adapter (T18) (7).**
5. Have helper lower shaft (2) on plank (6).
6. Remove hoist cable (3) and hoisting eye (T32) (1).



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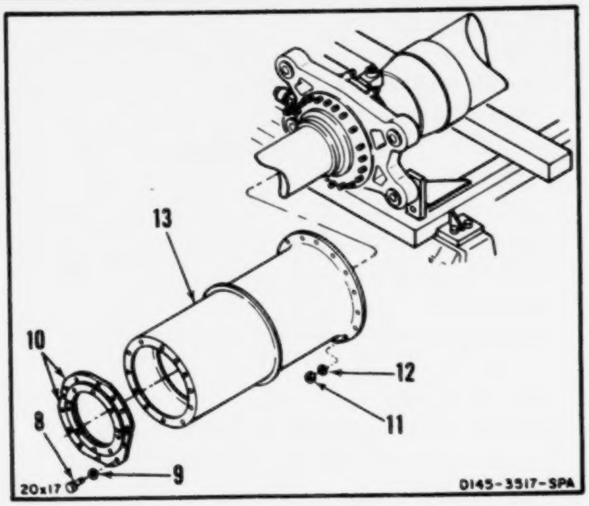
## 6-53 REMOVE AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-53

*REMOVE SLIDER SHAFT*

7. Remove lockwire, if installed, from 12 bolts (8). **Remove bolts** and washers (9).
8. **Remove both halves of seal (10).**
9. Remove 16 nuts (11) and washers (12).
10. **Remove slider shaft (13).** If needed, heat base of slider shaft to 230 to 250°F (110 to 120°C). Use heat gun and measure temperature with pyrometer. If needed, use phenolic wedge to lift shaft.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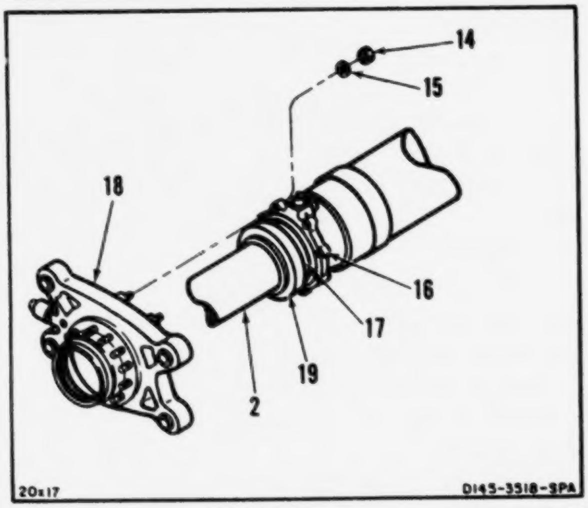
*REMOVE SEAL*

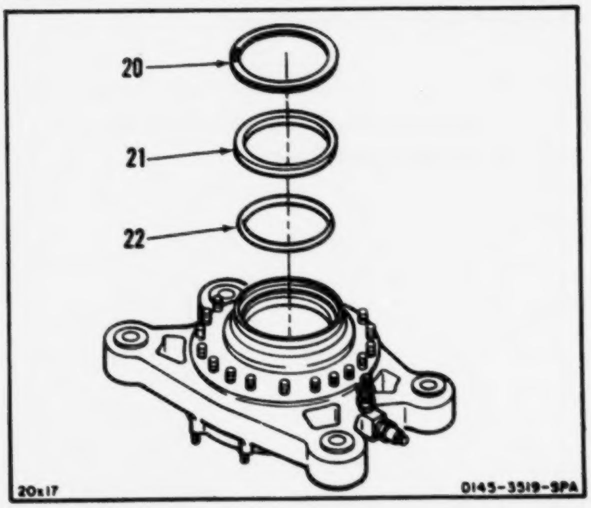
11. Remove 10 nuts (14) and washers (15) from bearing retainer (16). Pull retainer and packing (17) away from support (18).
12. **Remove support (18) from bearing (19).** Use soft-faced mallet. If needed, heat support to 230 to 250°F (110 to 120°C). Use heat gun and measure temperature with pyrometer.
13. **Slide support (18) from shaft (2).**


14
15
18
16
17
19
2
20x17
D145-3518-SPA

14. Remove retaining ring (20).
15. **Remove seal (21).**
16. Remove packing (22).

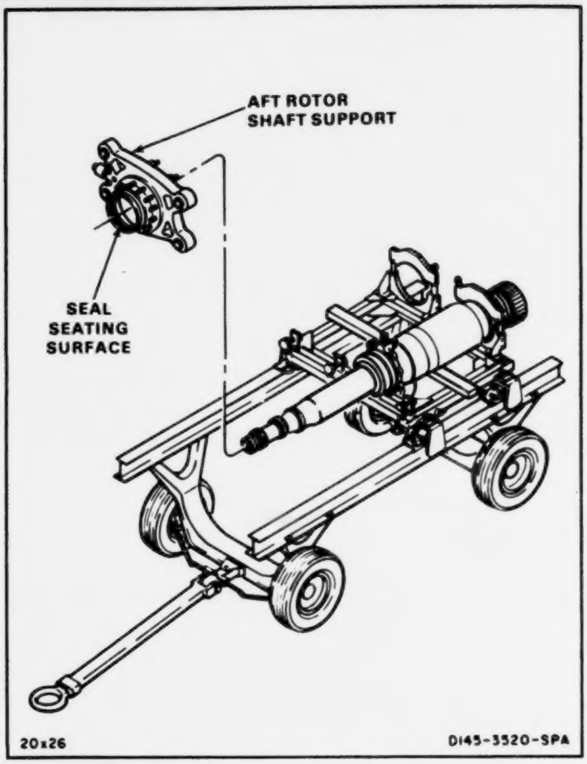
FOLLOW-ON MAINTENANCE:

None


20
21
22
20x17
D145-3519-SPA

**END OF TASK**

## 6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) 6-54



INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Oven (250°F) or Gun-Type Heater
Pyrometer
Kevlar Gloves (E187)
Brass or Aluminum Drift
Hoisting Eye (T32)
Work Hoist
Source of Low Pressure Compressed Air
Container, Two Quart
Adapter (T18)
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Stop Watch

***Materials:***

Gloves (E186)
Oil (E254)
Dry Cleaning Solvent (E162)
Cloths (E120)
Lockwire (E231)

***Parts:***

Packings
Seal

***Personnel Required:***

Medium Helicopter Repairer
Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Wear Kevlar gloves when handling heated parts.**

*GO TO NEXT PAGE*

## 6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-54

*INSTALL SEAL*

WARNING

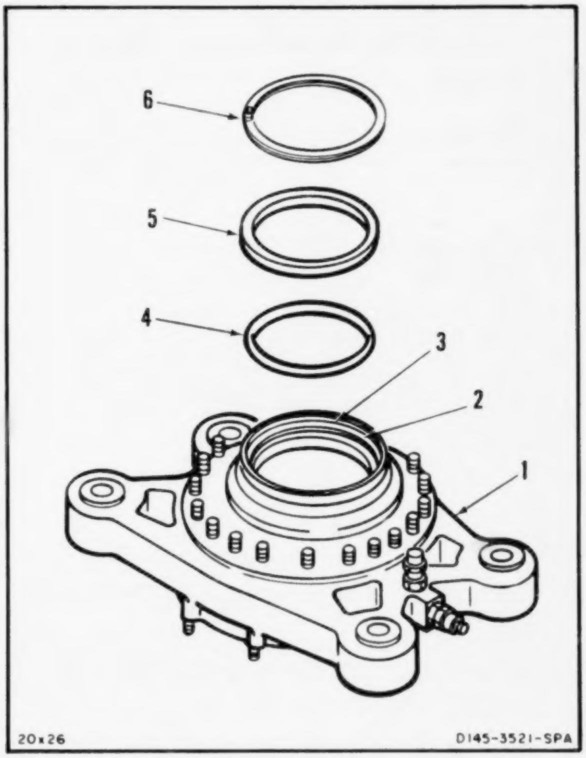
**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean support (1) with dry cleaning solvent (E162) and cloths (E120). Make sure seal seat (2) and packing groove (3) are clean. Use goggles and wear gloves (E186).

CAUTION

**Do not heat support over 250 °F (120° C). Damage to support can occur.**

2. **Heat seal seat (2) to 230 to 250° F (110 to 120° C). Use heat gun and measure temperature with pyrometer.**
3. Coat packing (4) with oil (E254). Install packing in support (1).
4. Coat outside of seal (5) with oil (E254). **Install seal,** seal side up, in support (1). Use drift.
5. Install retaining ring (6).



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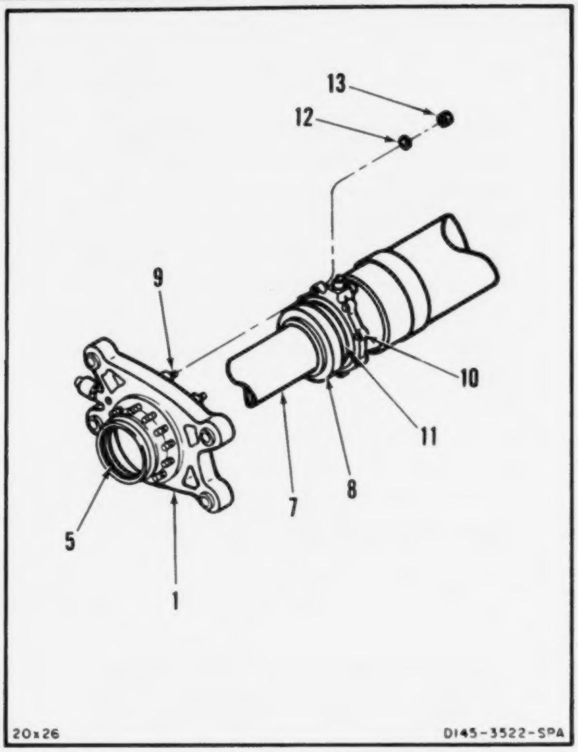
## 6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-54

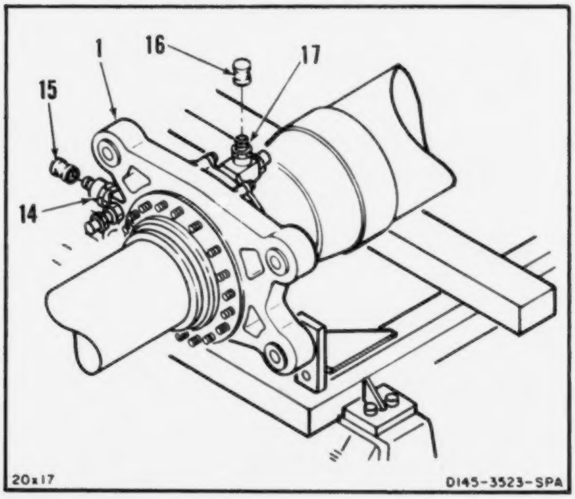
### *INSTALL SUPPORT*

6. Coat lip of seal (5) with oil (E254). **Install support (1)** over rotor shaft (7) and on bearing (8). Use soft-faced mallet.
7. Coat thread of 10 studs (9) on support (1) with oil (E254).
8. Coat shaft (7) between bearing (8) and bearing retainer (10) with oil (E254).
9. **Position bearing retainer (10)** and packing (11) on support (1). Install 10 washers (12) and nuts (13). **Torque nuts to 175 inch-pounds.**



### *CHECK SEAL*

10. Turn support (1) to position filter (14) as high as possible.
11. Remove cap (15) from filter (14). Remove cap (16) from drain port (17).
12. **Add oil (E254) through drain port (17)** until oil flows from filter (14).
13. Install cap (15) on filter (14). Install cap (16) on drain port (17).



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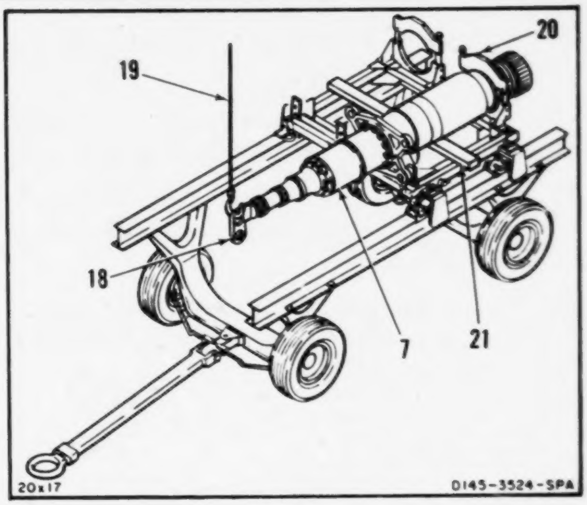
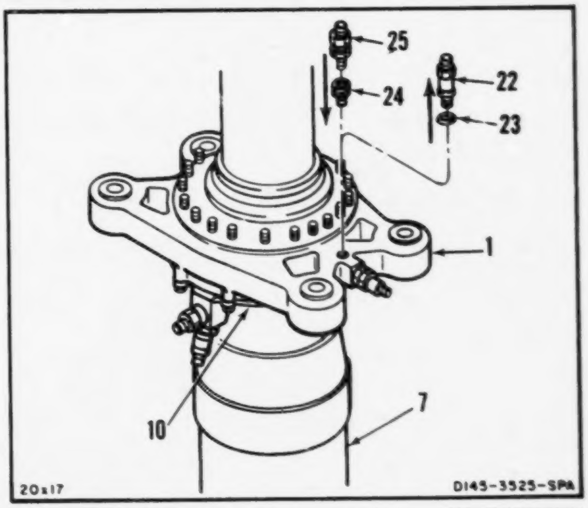
## 6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-54

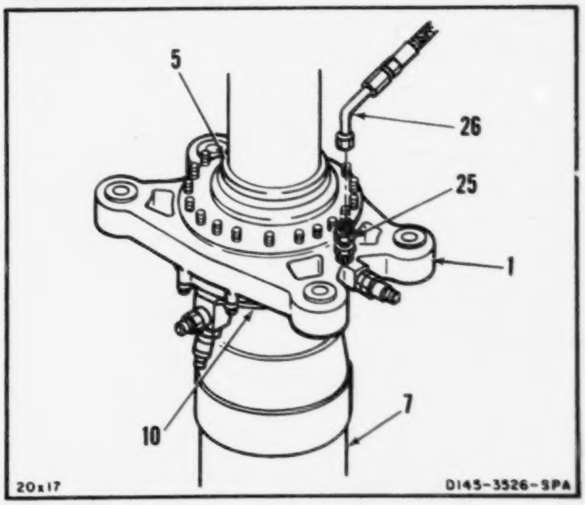
14. **Install hoisting eye (T32) (18)** on shaft (7).
15. **Connect hoist cable (19)** to eye of hoisting eye (T32) (18) marked AFT SHAFT. Have helper raise hoist to remove slack from cable.
16. **Release calmp (20).** Remove plank (21).



17. **Have helper raise shaft (7) to vertical. After 5 minutes, check bottom of bearing retainer (10) for leaks.** There shall be no leaks.
18. Remove lockwire from pressure switch (22). **Remove pressure switch** and packing (23).
19. Install adapter (24) in housing (1). Install air charging valve (25) in adapter.



20. Connect air chuck (26) to valve (25). **Apply 3 psi air pressure to valve.** Hold support (1) and **turn shaft (7) one full turn. Wait 5 minutes.**
21. **Turn shaft (7) another full turn. Wait 5 minutes.**
22. **Check bottom of bearing retainer (10) for leaks.** There shall be no leaks.
23. **Check air pressure in support (1). If pressure drops from 3 psi, check seal (5) installation.**



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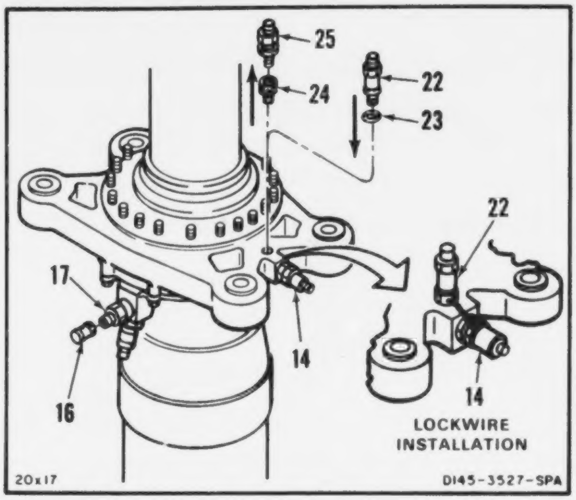
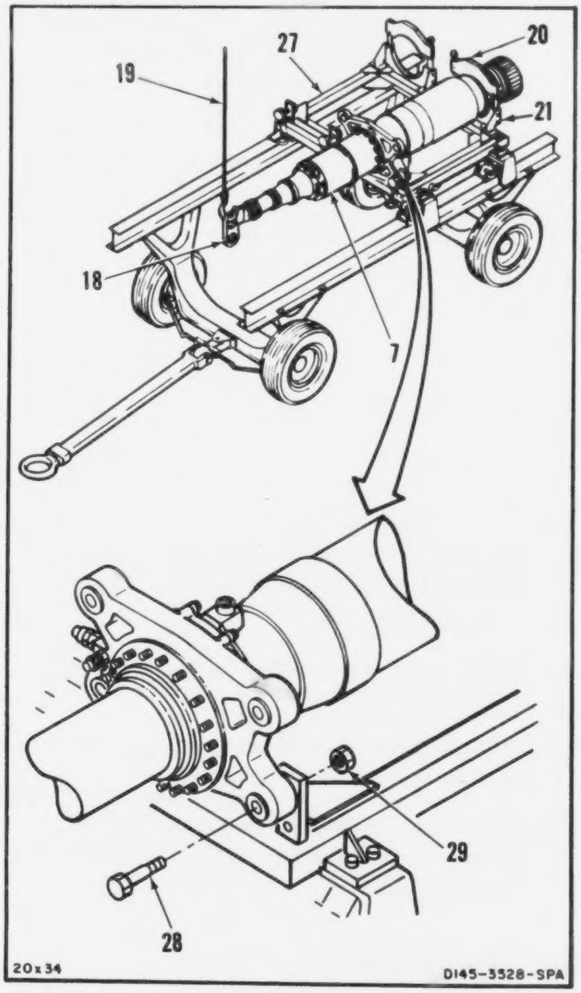
## 6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-54

24. Remove air charging valve (25) and adapter (24).
25. Remove cap (16) from drain port (17). Let oil drain. Use container for oil. Install cap.
26. Coat packing (23) and thread of pressure switch (22) with oil (E254). **Install** packing and **switch.**
27. **Torque switch (22) to 75 inch-pounds.** Lockwire switch to filter (14). Use lockwire (E231).


25
24
22
23
22
17
14
16
14
LOCKWIRE INSTALLATION
20x17
DI45-3527-SPA

28. **Install shaft (7) in adapter (T18) (27).** Tighten clamp (20).
29. **Install two bolts (28) and nuts (29).**
30. Remove hoist cable (19) and hoisting eye (T32) (18).


27
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19
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18
7
29
28
20x34
DI45-3528-SPA

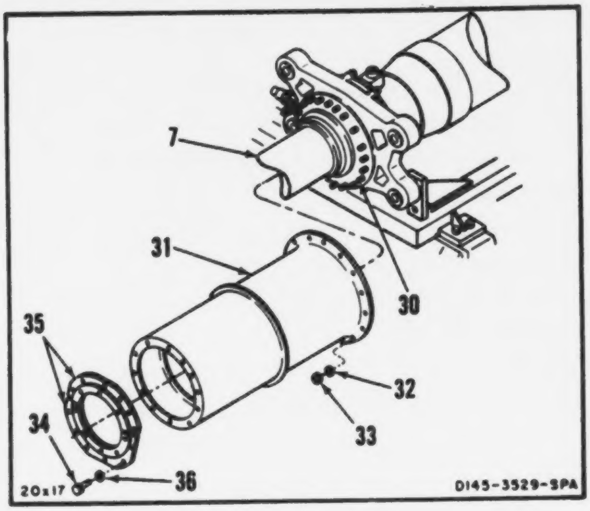
***INSPECT***

***GO TO NEXT PAGE***

## 6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued) 6-54

*INSTALL SLIDER SHAFT*

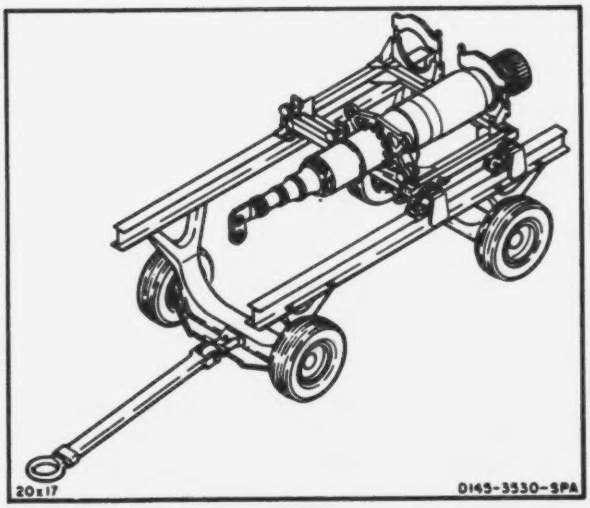
31. Coat 16 studs (20) with oil (E254).
32. **Install slider shaft (31)** over rotor shaft (7) and on studs (30). If needed, heat base of slider shaft to 230 to 250°F (110 to 120°C). Use heat gun and measure temperature with pyrometer.
33. Install 16 washers (32) and nuts (33). **Torque nuts to 120 inch-pounds.**
34. Coat 12 bolts (34) with oil (E254).
35. **Position two halves of seal (35)** on shaft (31). **Install 12** washers (36) and **bolts (34). Torque bolts to 60 inch-pounds.**



*INSPECT*

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-55 INSTALL AFT SLIDER SHAFT 6-55

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***

None

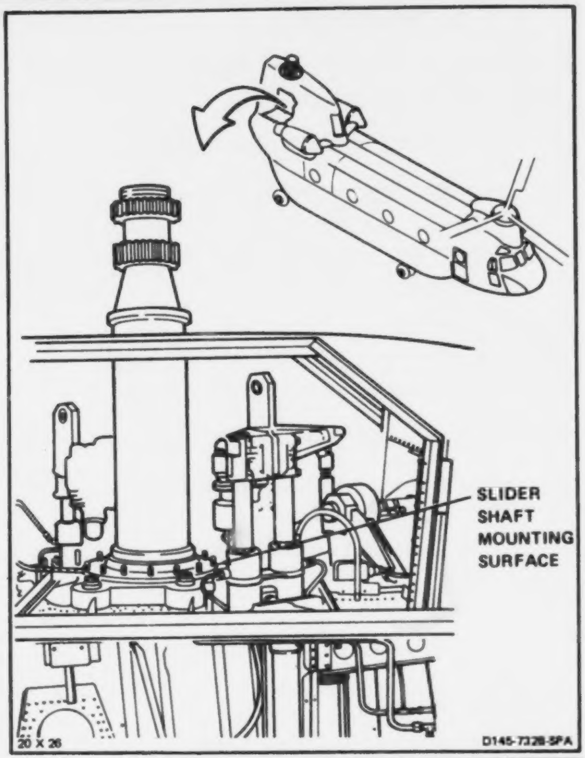
***Personnel Required:***

Medium Helicopter Repairer

Inspector

***References:***

TM 55-1520-240-23P



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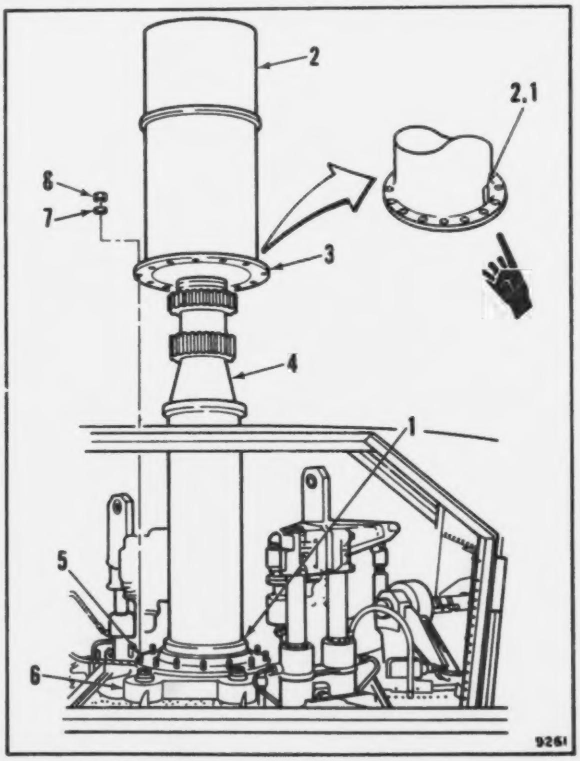
1. Remove tape and barrier material from around seal (1).

**CAUTION**

**Handle aft slider shaft carefully. Polished surface is easily damaged.**

2. **Position slider shaft (2) with drain hole (2.1) forward.** Lower slider shaft, flange (3) down, over rotor shaft (4). **Position slider shaft on 16 studs (5).** Tap top of slider shaft with soft-faced mallet as needed to seat shaft on housing (6).
3. **Install four washers (7) and nuts (8)** 90 degrees apart. **Tighten nuts evenly** to seat shaft (2). Do not torque nuts.
4. **Install remaining 12** washers (7) and **nuts (8). Torque all nuts to 120 inch-pounds.**



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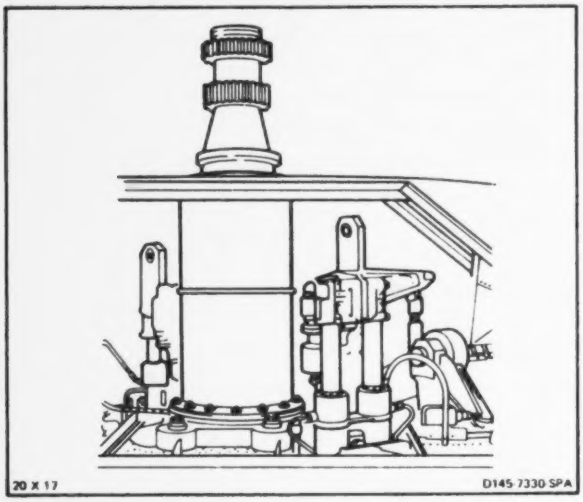
## 6-55 INSTALL AFT SLIDER SHAFT (Continued) 6-55



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install aft swashplate (Task 5-133).

Install aft drive arms (Task 5-112).

Install aft drive collar (Task 5-111).

Install aft weather-protective cover (Task 5-138).

Install aft rotary-wing head (Task 5-9).

Install aft rotary-wing blades (Task 5-84).

Close aft pylon work platforms (Task 2-2).

**END OF TASK**

## 6-56 REMOVE AFT ROTOR SHAFT THROUGH TOP OF PYLON 6-56

INITIAL SETUP

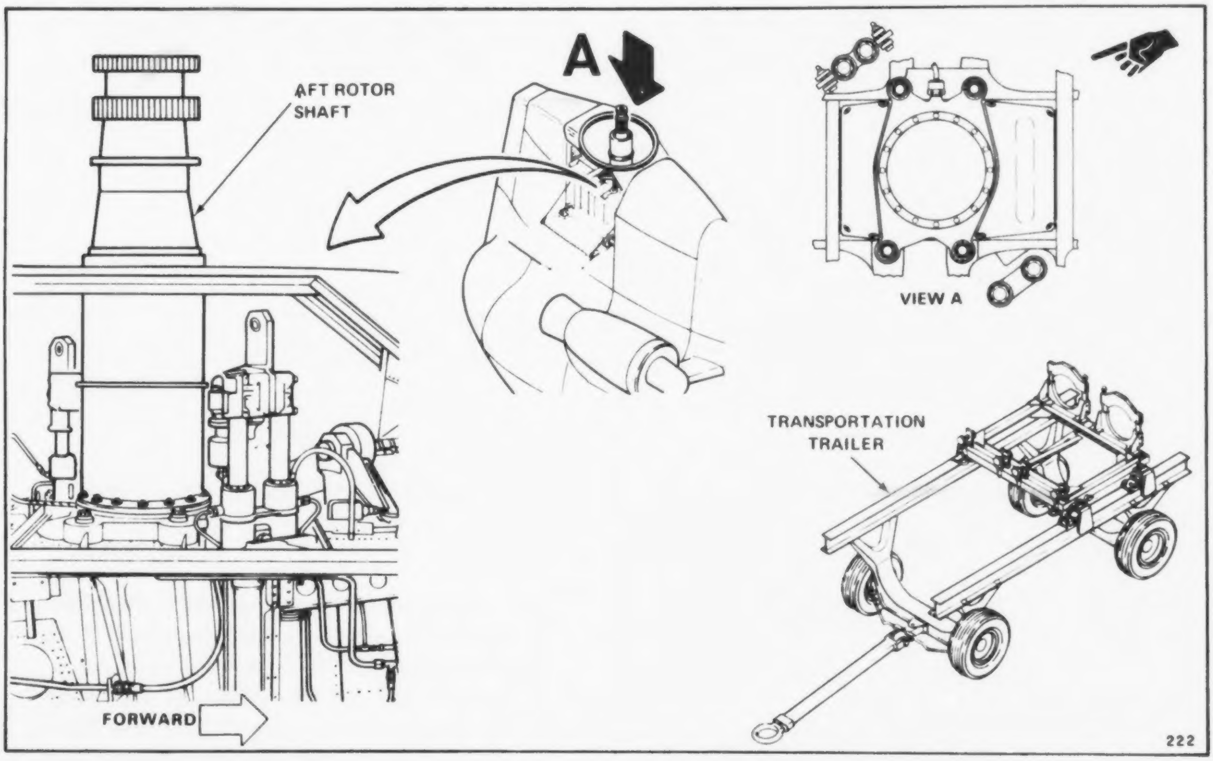
***Applicable Configurations:***
All

***Tools:***
- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Hoist Capable of Lifting 500 Pounds
- Hoisting Eye (T32)
- Socket, 1-Inch, 3/4-Inch Drive
- Breaker Bar, 3/4-Inch Drive

***Materials:***
- Barrier Material (E81)
- Tape (E388)

***Personnel Required:***
Medium Helicopter Repairer (3)

***Equipment Condition:***
- Pylon Work Platforms Open (Task 2-2)
- Rotary-Wing Blades Removed (Task 5-64)
- Rotary-Wing Head Removed (Task 5-8)
- Weather-Protective Cover Removed (Task 5-136)
- Drive Collar Removed (Task 5-100)
- Drive Arms Removed (Task 5-101)
- Swashplate Removed (Task 5-116)
- Adapter (T18) Installed on Transportation Trailer 2000



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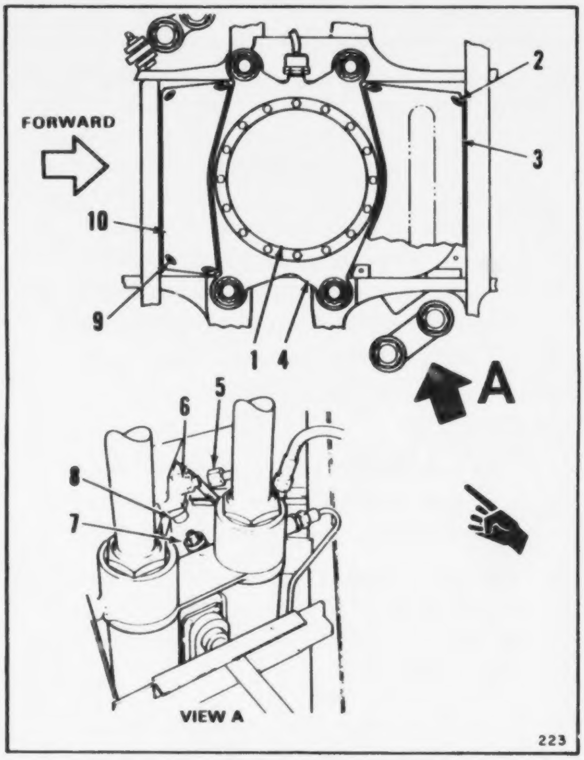
## 6-56 REMOVE AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued) 6-56

**NOTE**

If there is not enough overhead clearance or hoist height, lower shaft through pylon (Task 6-57).

1. Cover slider shaft (1) with barrier material (E81) and tape (E388).
2. Loosen four turnlock fasteners (2) on access panel (3) forward of bearing support (4). **Remove panel.**
3. **Disconnect hose (5)** from union (6). **Disconnect connector (7)** from chip detector (8).
4. Loosen four turnlock fasteners (9) on access panel (10) aft of bearing support (4). **Remove panel.**



5. **Disconnect hose (11)** from filter (12). **Disconnect connector (13)** from pressure transmitter (14).
6. **Install hoisting eye (T32) (15)** in top of rotor shaft (16).

**NOTE**

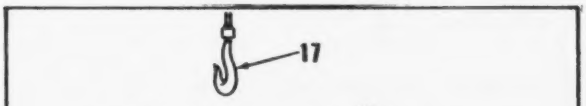
AFT SHAFT hole must be used for proper shaft alignment during removal.

7. **Connect hoist hook (17)** to AFT SHAFT hole (18) of hoisting eye (T32) (15). Raise hoist to **take up slack.** Do not apply tension.

**CAUTION**

**If bolts are not removed, thread can be damaged and bolt holes scored during shaft removal.**

8. Remove nuts (19) and washers (20) from four bolts (21) on bearing support (4). **Remove bolts and washers (22).**



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## 6-56 REMOVE AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued) 6-56

9. Tie rope guide line (23) around rotor shaft (16).

**WARNING**

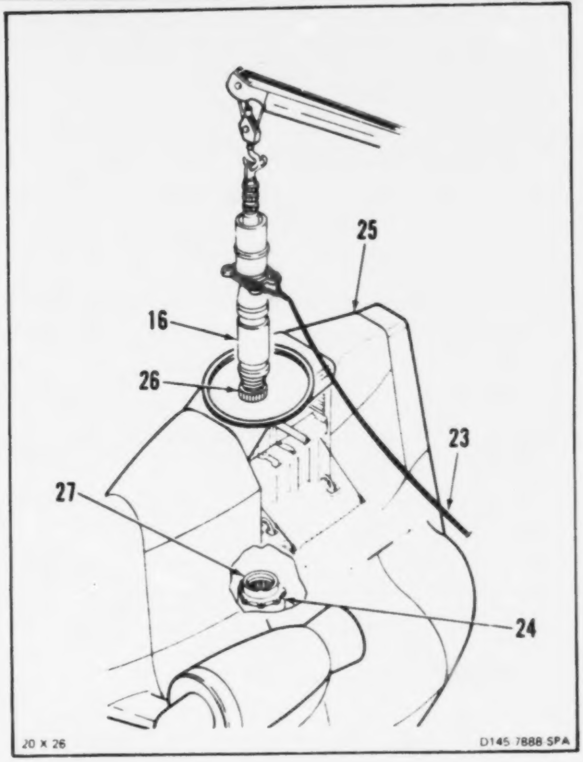
**Rotor shaft is heavy and can injure personnel if it drops. Shaft must be supported by hoist and moved carefully to prevent injury to personnel.**

**CAUTION**

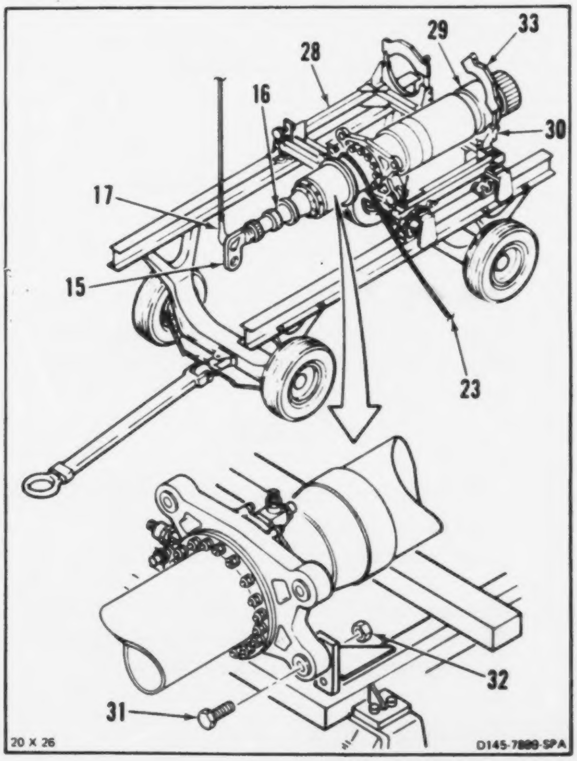
**If rotor shaft is not lifted straight out of transmission, shaft splines can damage seal in transmission.**

10. **Lift rotor shaft (16)** straight up and out of transmission (24) and pylon (25). Cover splines (26) with barrier material (E81) and tape (E388).

11. Cover opening (27) in top of aft transmission (28). Use barrier material (E81) and tape (E388).



12. Lower rotor shaft (16) to adapter (T18) (28). **Install shaft in adapter** as follows:
    a. Align lower ring (29) with plate (30). Lower shaft (4) to position ring in plate.
    b. Continue lowering shaft (16) to adapter (T18) (28). Install two bolts (31) and nuts (32).
    c. Install clamp (33) over ring (29).
13. Remove hoist hook (17) from hoisting eye (T32) (15). Remove eye.
14. Remove rope guide line (23).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-57 REMOVE AFT ROTOR SHAFT THROUGH CABIN 6-57

INITIAL SETUP

**Applicable Configurations:**
All

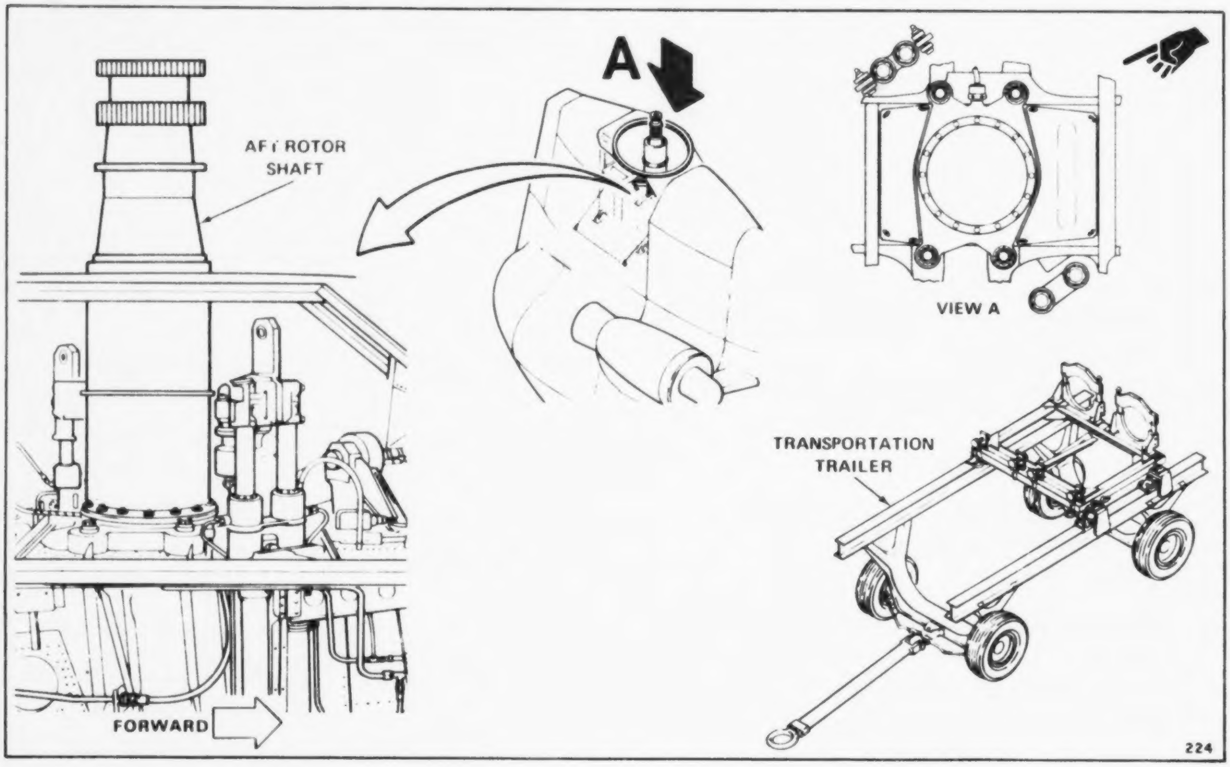
**Tools:**
- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Hoist Capable of Lifting 500 Pounds
- Hoisting Eye (T32)
- Socket, 1-Inch, 3/4-Inch Drive
- Breaker Bar, 3/4-Inch Drive

**Materials:**
- Barrier Material (E81)
- Tape (E388)

**Personnel Required:**
- Medium Helicopter Repairer (3)

**References:**
- TM 55-1520-240-10

**Equipment Condition:**
- Pylon Work Platforms Open (Task 2-2)
- Rotary-Wing Blades Removed (Task 5-64)
- Rotary-Wing Head Removed (Task 5-8)
- Weather-Protective Cover Removed (Task 5-136)
- Aft Drive Collar Removed (Task 5-100)
- Aft Drive Arms Removed (Task 5-101)
- Aft Swashplate Removed (Task 5-116)
- Aft Transmission Removed (Task 6-92)
- Adapter (T18) Installed on Transportation Trailer 2000
- Cargo Ramp Open (TM 55-1520-240-T)



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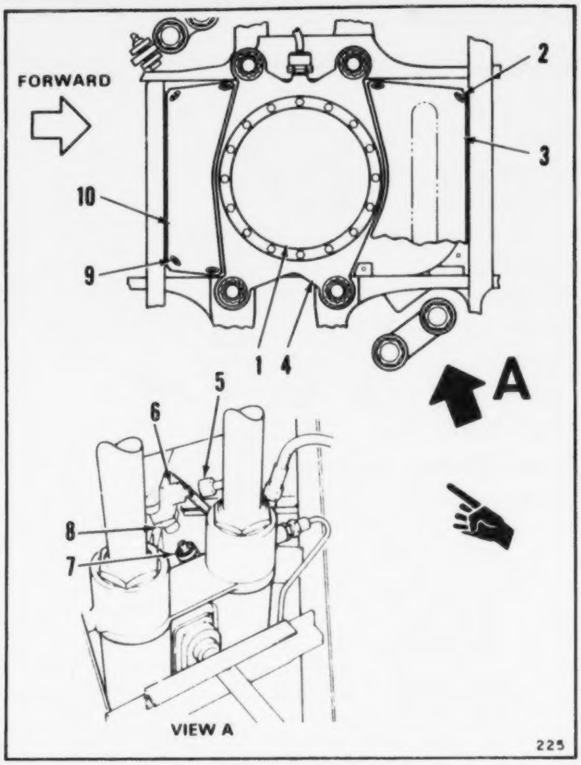
## 6-57 REMOVE AFT ROTOR SHAFT THROUGH CABIN (Continued) 6-57

1. Cover slider shaft (1) with barrier material (E81) and tape (E388).
2. Loosen four turnlock fasteners (2) on access panel (3) forward of bearing support (4). **Remove panel.**
3. **Disconnect hose (5)** from union (6). **Disconnect connector (7)** from chip detector (8).
4. Loosen four turnlock fasteners (9) on access panel (10) aft of bearing support (4). **Remove panel.**


FORWARD
2
3
10
9
1
4
A
5
6
8
7
VIEW A
225

5. **Disconnect hose (11)** from filter (12). **Disconnect connector (13)** from pressure transmitter (14).
6. **Install hoisting eye (T32) (15)** in top of rotor shaft (16).

**NOTE**

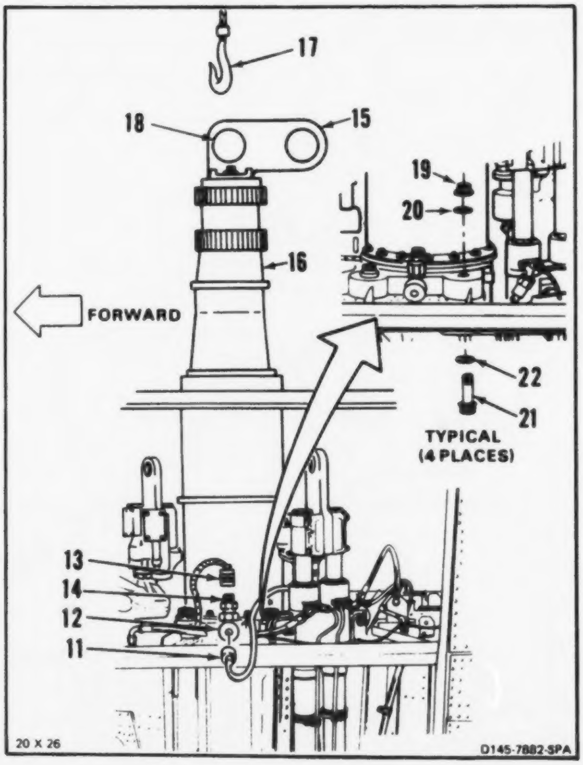
AFT SHAFT hole must be used for proper shaft alignment during removal.

7. **Connect hoist hook (17)** to AFT SHAFT hole (18) of hoisting eye (T32) (15). Raise hoist to **take up slack.** Do not apply tension.

**CAUTION**

**If bolts are not removed, thread can be damaged and bolt holes scored during shaft removal.**

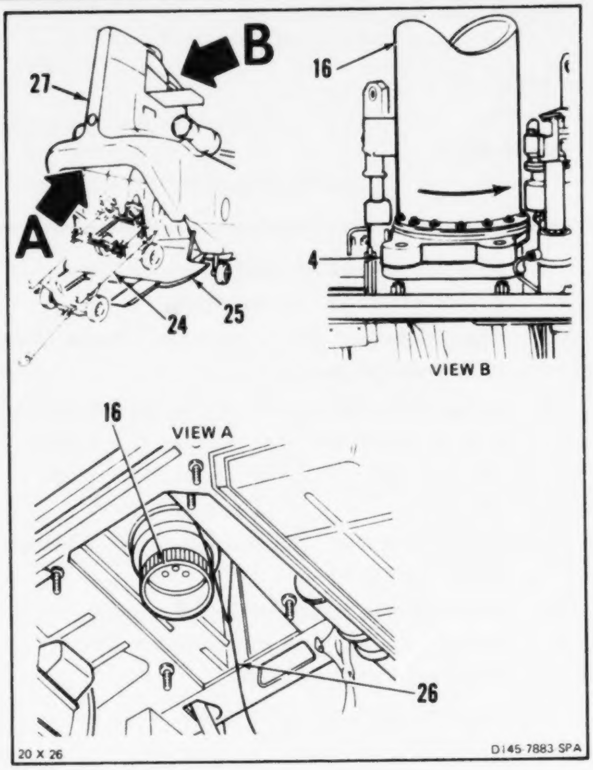
8. Remove nuts (19) and washers (20) from four bolts (21) on bearing support (4). **Remove bolts and washers (22).**


17
18
15
19
20
16
FORWARD
22
21
TYPICAL (4 PLACES)
13
14
12
11
20 X 26
D145-7882-SPA

*GO TO NEXT PAGE*

## 6-57 REMOVE AFT ROTOR SHAFT THROUGH CABIN (Continued) 6-57

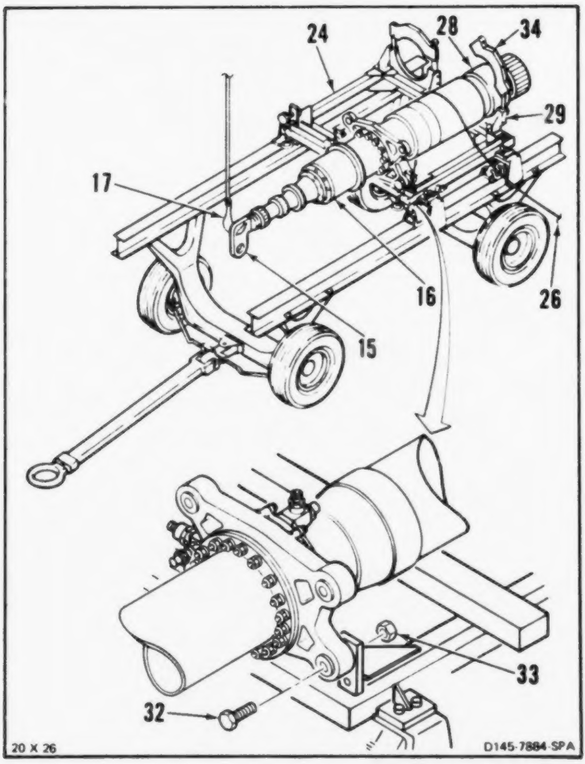
9. Position transportation trailer 2000 (23) with adapter (T18) (24) on cargo ramp (25). Raise ramp to level with hand pump (TM 55-1520-240-T).
10. Tie rope guide line (26) around bottom of shaft (16).
11. Raise shaft (16) about 2 inches. **Rotate bearing support (4)** 90 degrees.
12. **Lower shaft (16)** through pylon (27) to adapter (T18) (24).


27
B
16
A
4
24
25
VIEW B
16
VIEW A
26
20 X 26
D145-7883 SPA

13. **Install rotor shaft (16) in adapter (T18) (24)** as follows:
    a. Align lower ring (28) with plate (29). Lower shaft (16) to position ring in plate.
    b. Continue lowering shaft (16) to adapter (T18) (24). Install two bolts (30) and nuts (31).
    c. Install clamp (32) over ring (28).
14. Remove hoist hook (17) from hoisting eye (T32) (15). Remove eye.
15. Remove rope guide line (26). Lower cargo ramp (25) to ground with hand pump (TM 55-1520-240-T).
16. Remove shaft (16) from helicopter.

FOLLOW-ON MAINTENANCE:

None


24
28
34
29
17
16
26
15
33
32
20 X 26
D145-7884-SPA

**END OF TASK**

## 6-58 INSPECT AFT ROTOR SHAFT 6-58

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
None

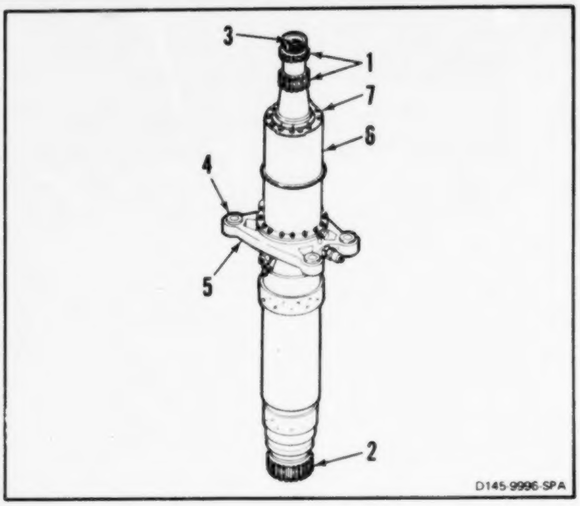
***Personnel Required:***
Inspector

***References:***
Task 6-52.1

***Equipment Condition:***
Off Helicopter Task

---

1. **Check splines (1 and 2)** for damage. **There shall be no damage.**
2. **Check thread (3)** for damage. **There shall be no damage.**
3. **Inspect bushings (4)** at top and bottom of four mounting holes in support (5). **There shall be no** cracks, wear, or other **damage.**
4. **Check support (5)** for oil leakage. **There shall be no oil.**
5. **Inspect slider shaft (6)** for damage. **Damage shall not exceed the limits specified in task 6-52.1.**
6. **Inspect seal (7). There shall be no damage.**



FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-59 REPAIR AFT ROTOR SHAFT 6-59

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Depth Gage 643J

***Materials:***
Crocus Cloth (E122)
Cloths (E120)

***Personnel Required:***
67U20 Medium Helicopter Repairer
67U30 Inspector

***Equipment Condition:***
Off Helicopter Task
Slider Shaft Removed (Task 6-53)

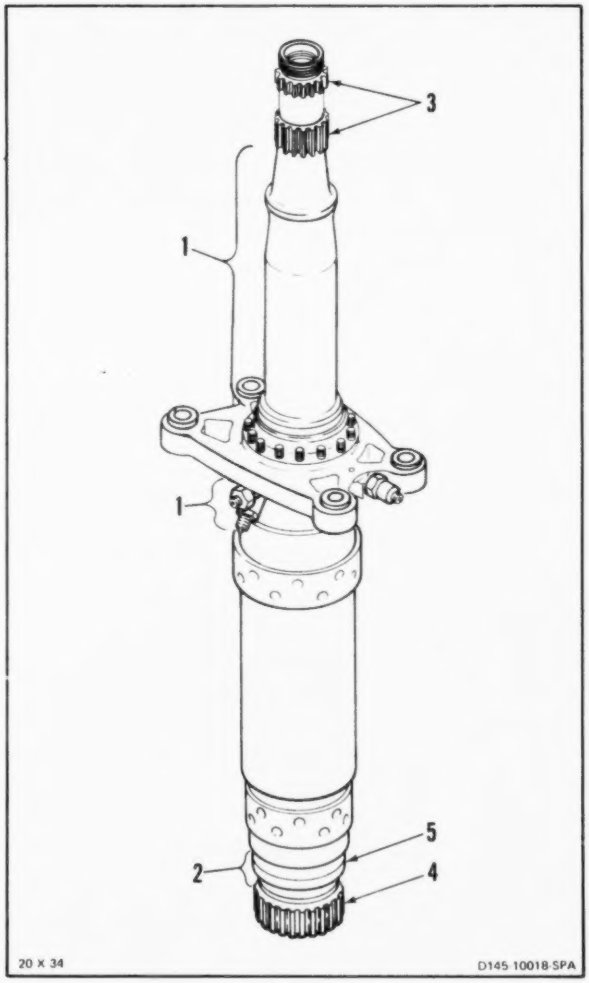
1. **Remove nicks and scratches** on rotor shaft with crocus cloth (E122). Observe following limits on upper shaft (1) and lower shaft (2):

   **NOTE**

   Limits for center section of shaft are in step 3.

   a. Blending shall not be more than 0.040 inch deep.
   b. Blending shall clear fasteners by a distance at least equal to fastener diameter.
   c. Blending shall not extend into a radius.
   d. Blending shall not be done to splines (3 and 4).
   e. No blending is allowed on seal mating surface (5).

2. **Remove corrosion on splines (3 and 4)** (TM 55-1520-204-25/1).



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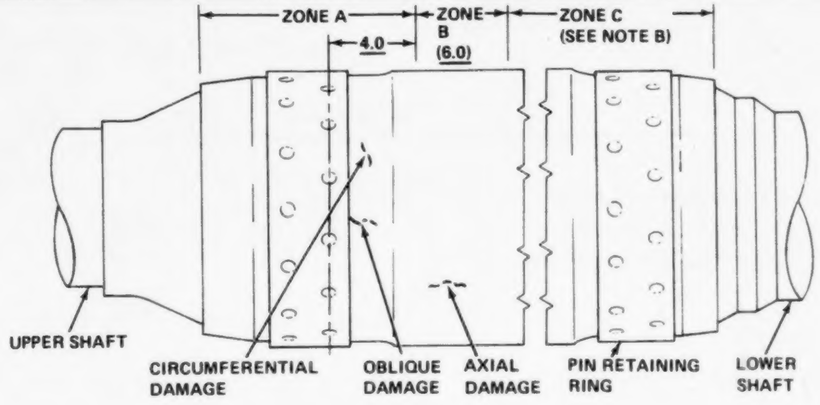
## 6-59 REPAIR AFT ROTOR SHAFT (Continued) 6-59

3. **Blend out damage to center section** as shown.


ZONE A
4.0
ZONE B
(6.0)
ZONE C
(SEE NOTE B)
UPPER SHAFT
CIRCUMFERENTIAL DAMAGE
OBLIQUE DAMAGE
AXIAL DAMAGE
PIN RETAINING RING
LOWER SHAFT

DAMAGE LIMITATIONS FOR ZONE A

| | CIRCUMFERENTIAL AND OBLIQUE DAMAGE | AXIAL DAMAGE |
|---|---|---|
| MAXIMUM DEPTH AFTER BLENDING | 0.005 | 0.010 |
| MINIMUM WIDTH AFTER BLENDING | 0.10 | 0.14 |
| MAXIMUM WIDTH AFTER BLENDING | 0.30 | 0.50 |
| MINIMUM BLEND RADIUS | 0.25 | 0.25 |

DAMAGE LIMITATIONS FOR ZONE B

| | CIRCUMFERENTIAL AND OBLIQUE DAMAGE | AXIAL DAMAGE |
|---|---|---|
| MAXIMUM DEPTH AFTER BLENDING | 0.010 | 0.015 |
| MINIMUM WIDTH AFTER BLENDING | 0.14 | 0.17 |
| MAXIMUM WIDTH AFTER BLENDING | 0.5 | 0.5 |
| MINIMUM BLEND RADIUS | 0.25 | 0.25 |

NOTES

A. ALL DIMENSIONS ARE IN INCHES
B. DAMAGE IN ZONE C MUST NOT EXCEED A DEPTH OF 0.040 AFTER BLENDING

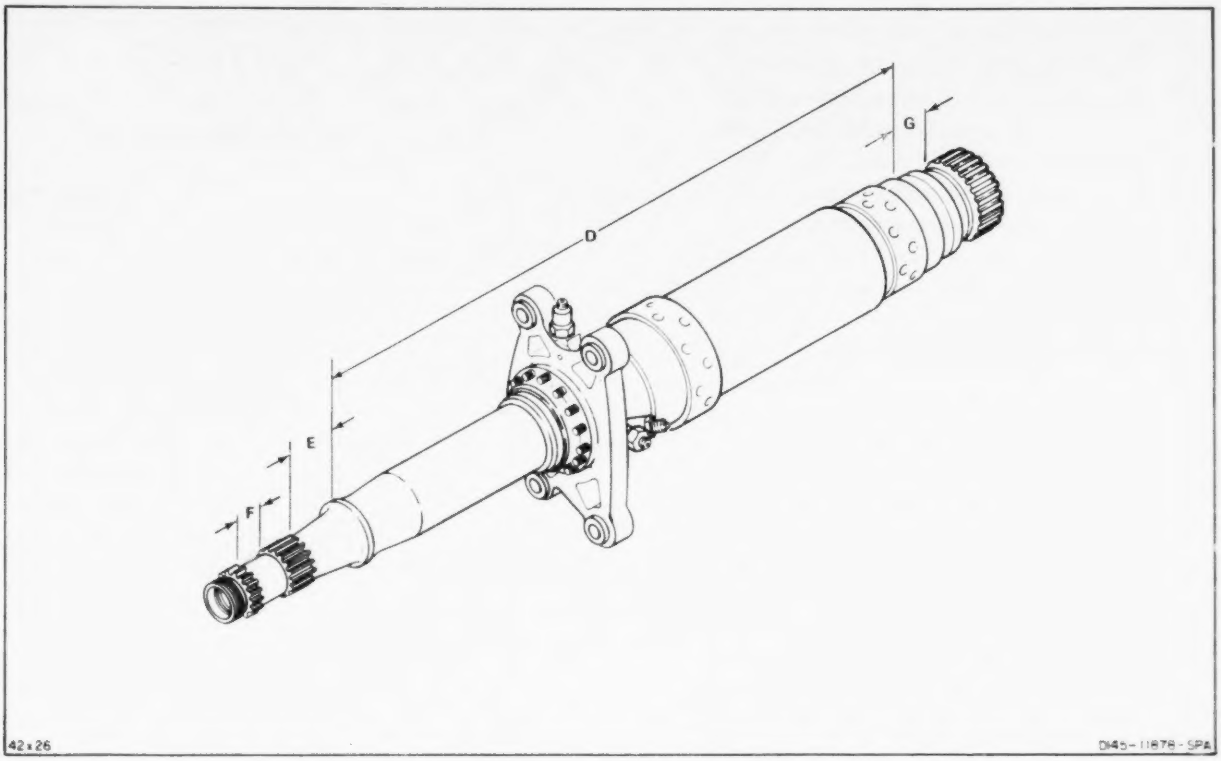
42 X 34

D145-10019-SPA

*GO TO NEXT PAGE*

## 6-59 REPAIR AFT ROTOR SHAFT (Continued) 6-59

4. Touch up blended areas as shown:



| BLEND AREA | MATERIAL | REFERENCE INSTRUCTIONS |
|---|---|---|
| D | One coat wash primer (E302) | MIL-C-8507 |
| | Two coats zinc chromate primer (E291) | MIL-P-6808 |
| E and F | Cadmium plate | MIL-STD-865<br>Bake at 260 to 290°F (125 to 145°C) for 23 hours within 2 hours after plating |
| | One coat wash primer (E302) | MIL-C-8507 |
| | Two coats epoxy primer (E291) | MIL-C-22751 |
| | One coat epoxy top coat, color #16081, engine gray (E166) | MIL-C-22751 |
| G | Instant gun blue, Formula 44-40 (E457) | Manufacturer's Instructions |

***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-59.1 REPAIR AFT ROTOR SHAFT SUPPORT 6-59.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Depth Gage 643J

***Materials:***
Naphtha (E245)
Emery Cloth (E123) or Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Zinc Chromate Primer (E291)
Chromic Acid (E114)
Calcium Sulphate (E91)

***Personnel Required:***
Aircraft Powertrain Repairer
Inspector

***References:***
TM 43-0103
MIL-C-5541
MIL-C-22751
MIL-L-3171

***Equipment Condition:***
Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Zinc chromate primer (E291) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

***GO TO NEXT PAGE***

## 6-59.1 REPAIR AFT ROTOR SHAFT SUPPORT (Continued) 6-59.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on support (1).

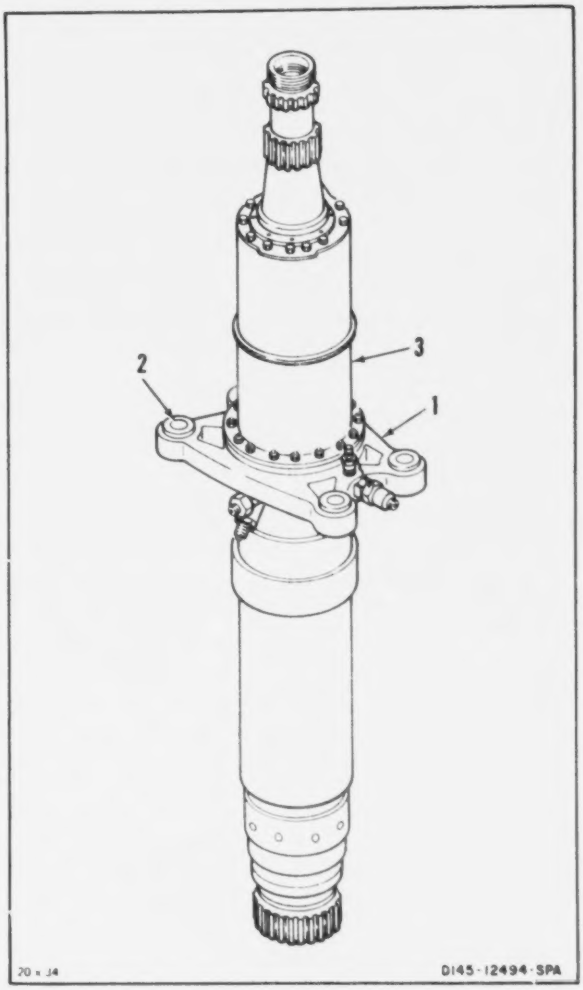
   **NOTE**

   Limits in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**

   b. **Damage shall not extend over more than one surface or enter any radius.**

   c. **Damage shall not be closer than 1.00 inch to any mounting hole.**
3. **Fluorescent inspect** damaged area to check for cracks (TM 41-0103). **There shall be no cracks.**
4. Protect slider shaft (3) near damaged area from abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.



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## 6-59.1 REPAIR AFT ROTOR SHAFT SUPPORT (Continued) 6-59.1

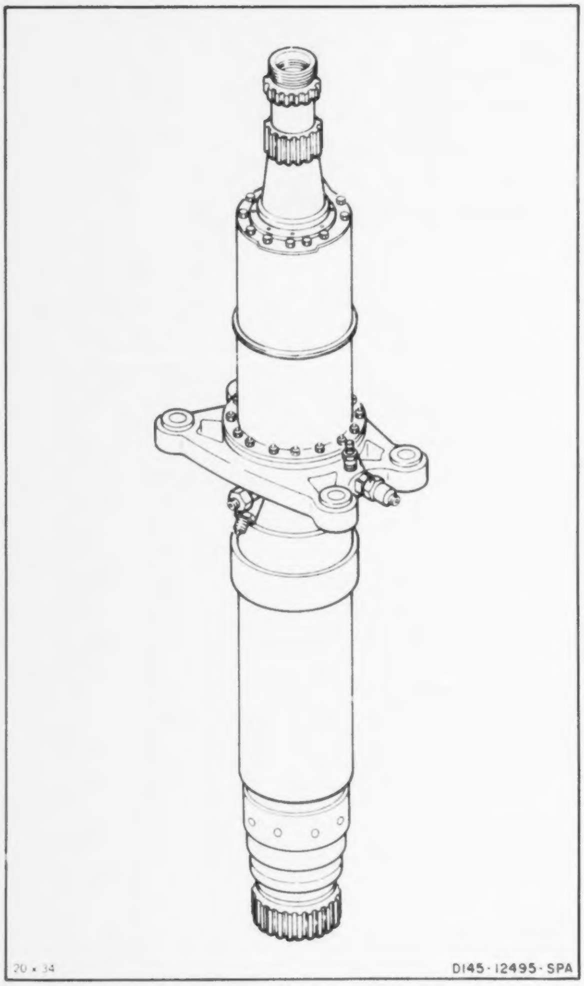
6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.

7. **Acid etch reworked area** as follows:
    a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.
    b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
    c. Rinse area with cold water.

8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**

9. Apply surface treatment to reworked area as follows:
    a. **Clean area with naphtha (E245)** and clean cloths. Wear gloves (E186). Let area air dry.
    b. **Swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry.

10. Apply zinc chromate primer (E291) to reworked area. Wear gloves (E186).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE 6-60

INITIAL SETUP

***Applicable Configurations:***
All

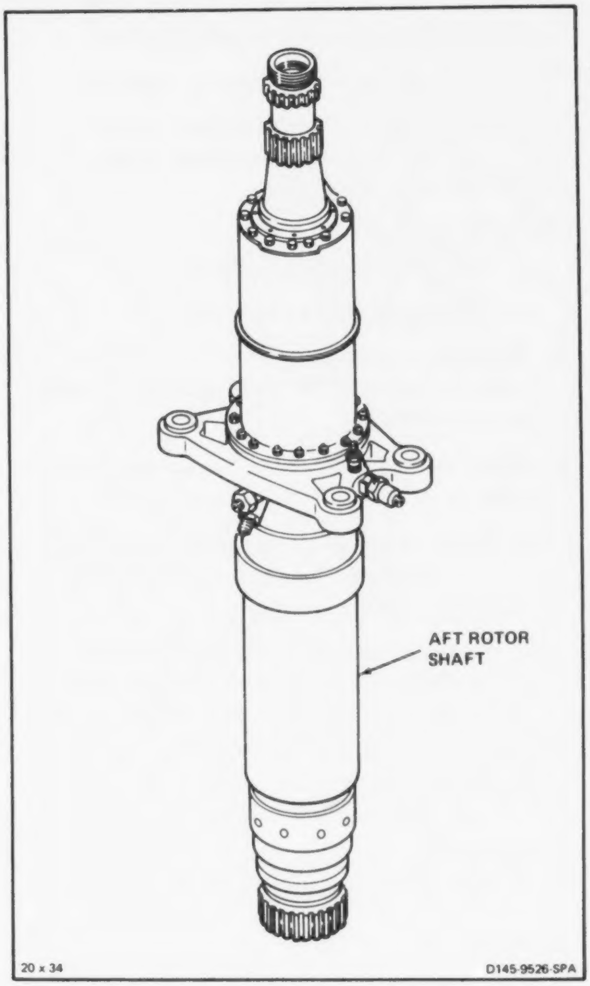
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist
Shipping Container (T1)
Container, Two Quart

***Materials:***
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Oil (E255)
Barrier Material (E81)
Masking Tape(E388)
Desiccant (E160), 16-Unit Bag

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***References:***
TB 55-8100-200-25

***Equipment Condition:***
Off Helicopter Task



***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

***GO TO NEXT PAGE***

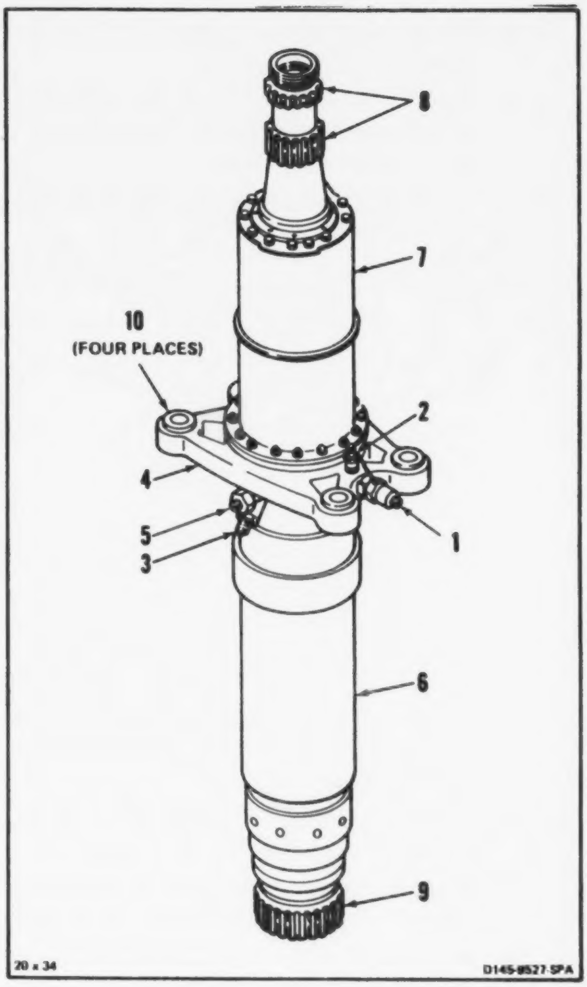
## 6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE (Continued) 6-60

1. **Install caps on filter (1), pressure switch (2), and chip detector (3).**
2. **Fill support housing (4) with oil (E255) through union (5). Cap union.**
   a. Rotate housing (4) around shaft (6) three times to spread oil inside housing.
   b. Remove cap from union (5). Drain oil from housing (4). Install cap on union.
3. **Clean all surfaces** of rotor shaft (6). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles. Wear gloves for the rest of this task.
4. **Clean slider shaft (7),** rotor head **splines (8),** transmission **splines (9) and four bushings (10).** Use fingerprint remover (E175) and clean cloths (E120).

**CAUTION**

**Touching unpainted surfaces with bare fingers can cause corrosion.**

5. Put on gloves (E186). Gloves shall be worn for the rest of this task.
6. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
7. **Coat slider shaft (7),splines (8 and 9), and bushings (10) with corrosion-preventive compound (E153 or E154).** Use cloth (E120) to coat shaft. Use swabbing brush (E86) to coat splines and bushings.
8. **Cover slider shaft (7), splines (8 and 9), and four bushings (10) with barrier material (E81) and tape (E388).**
9. **Cover filter (1), pressure switch (2), and chip detector (3), with barrier material (E81) and tape (E388).**



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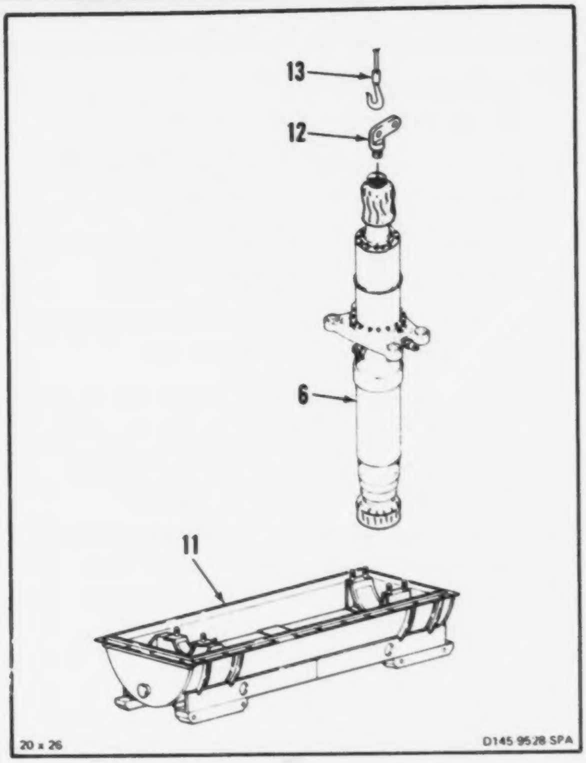
## 6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE (Continued) 6-60

10. Install rotor shaft (6) in shipping container (T1) (11) as follows:
    a. Inspect and prepare container (11) (TB 55-8100-200-25).
    b. Install hoisting eye (12) in top of shaft (6). Connect work hoist hook (13) to eye marked AFT SHAFT.
    c. With aid of helper, **lower shaft (6) into container (T1) (11).**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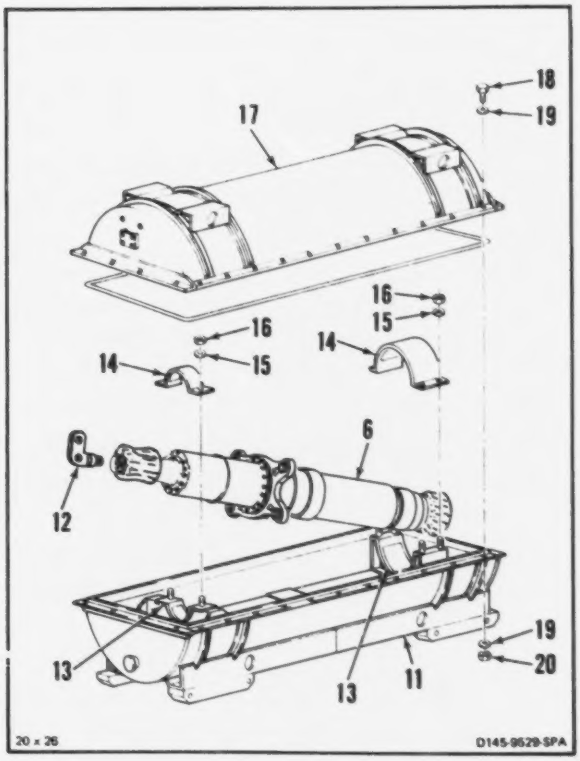
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11
20 x 26
D145-9529-SPA

    d. Remove hoisting eye (12) from shaft (6). With aid of helper, lower shaft into two pads (13).
    e. Install two clamps (14) over shaft (6). Install six washers (15) and nuts (16).
    f. Prepare required maintenance forms and records (TM 38-750 and TB 750-126).
    g. Put four 16-unit bags of desiccant (E160) into container (T1) (11).
    h. Install cover (17) on container (T1) (11). Install bolt (18), two washers (19), and nut (20) at 30 places.

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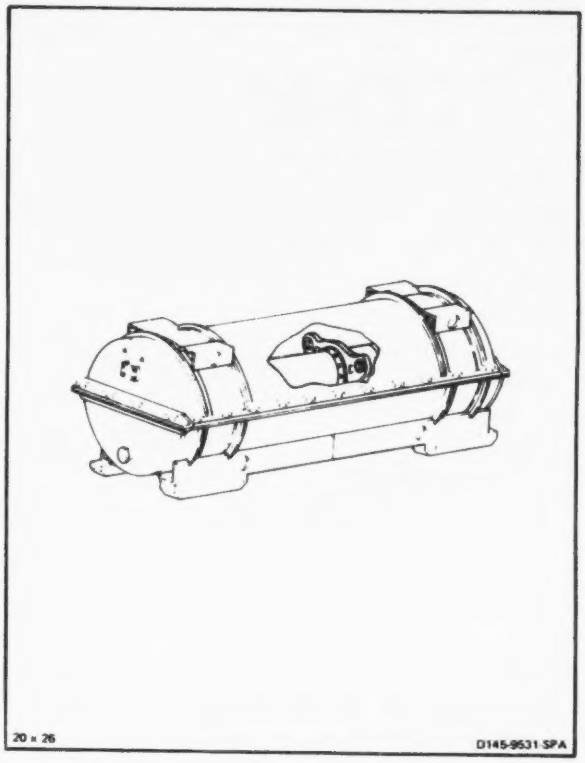
## 6-60 PREPARE AFT ROTOR SHAFT FOR SHIPMENT OR STORAGE (Continued) 6-60

FOLLOW-ON MAINTENANCE:

None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**END OF TASK**

## 6-61 REMOVE AFT ROTOR SHAFT FROM STORAGE 6-61

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Work Hoist

***Materials:***

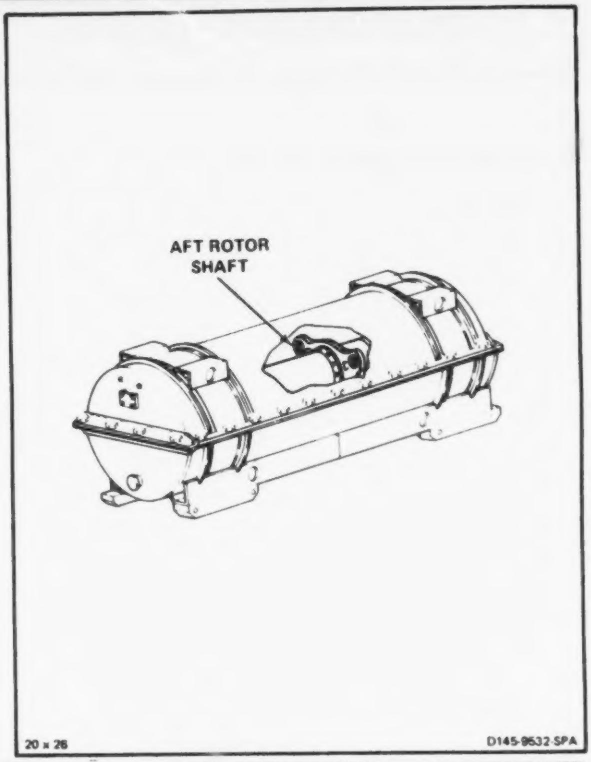
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

***Personnel Required:***

Medium Helicopter Repairer (2)
Inspector

***Equipment Condition:***

Off Helicopter Task



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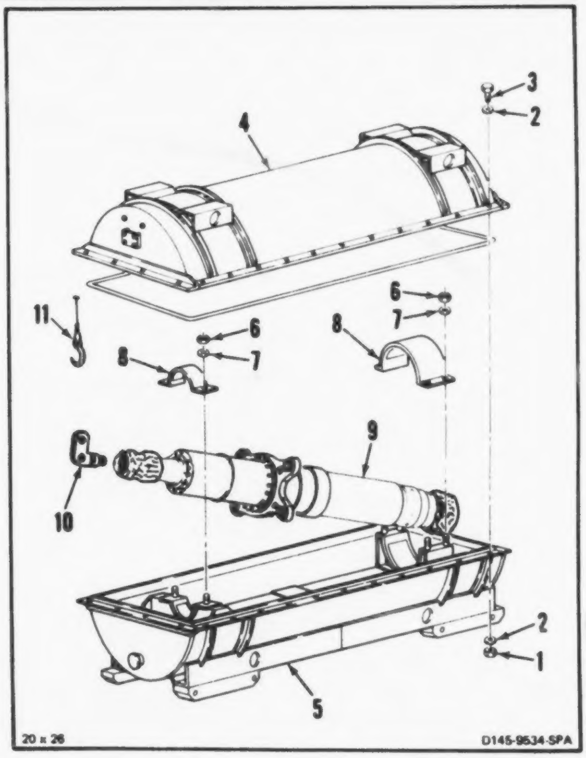
1. Remove nut (1), two washers (2), and bolt (3) from 30 places around cover (4).
2. Remove and discard desiccant bags from inside container (5).
3. Remove six nuts (6) and washers (7) from two clamps (8). **Remove clamps.**
4. With aid of helper, raise top end of shaft (9) from container (5). **Install hoisting eye (T32) (10)** in shaft.

**CAUTION**

**If bottom of shaft hits container, covered splines can be damaged.**

5. Connect work hoist hook (11) to eye of hoisting eye (10) marked AFT SHAFT. **Lift shaft** from container. Do not let bottom of shaft (9) hit container (5).
6. Set shaft (9) down on bench or workstand. Remove hoisting eye (T32) (3).
7. Install two clamps (8) in container (5). Install six washers (7) and nuts (6).
8. Install cover (4). Install bolt (3), two washers (2), and nut (1) at 30 places around cover.



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## 6-61 REMOVE AFT ROTOR SHAFT FROM STORAGE (Continued) 6-61

9. **Remove all tape and barrier material** from shaft (9).

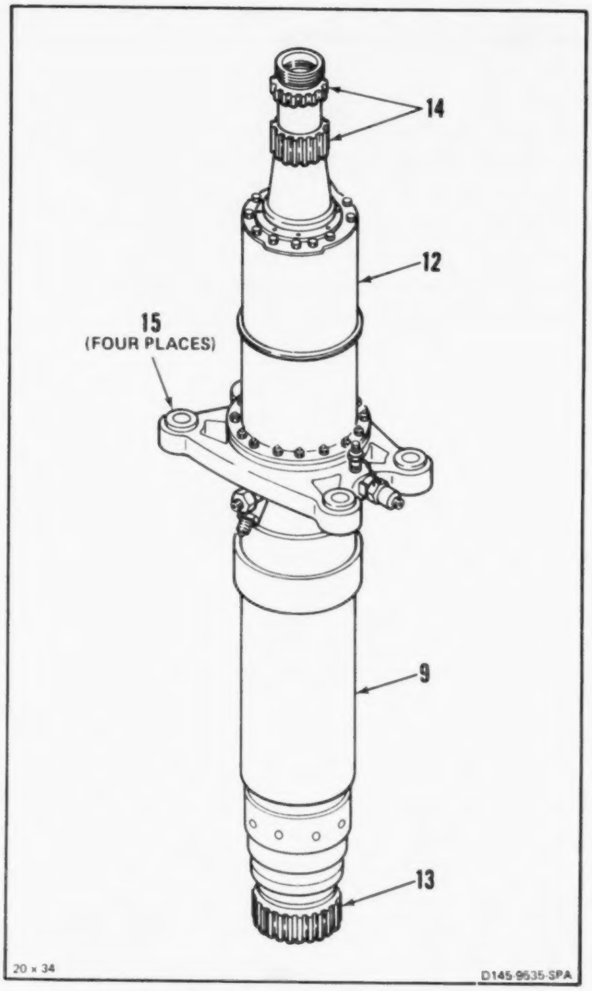
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Touching splines with bare fingers can cause corrosion.**

10. **Remove corrosion-preventive compound from slider shaft (12),** transmission splines (13), rotor head **splines (14), and four bushings (15).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



*INSPECT*

FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON 6-62

INITIAL SETUP

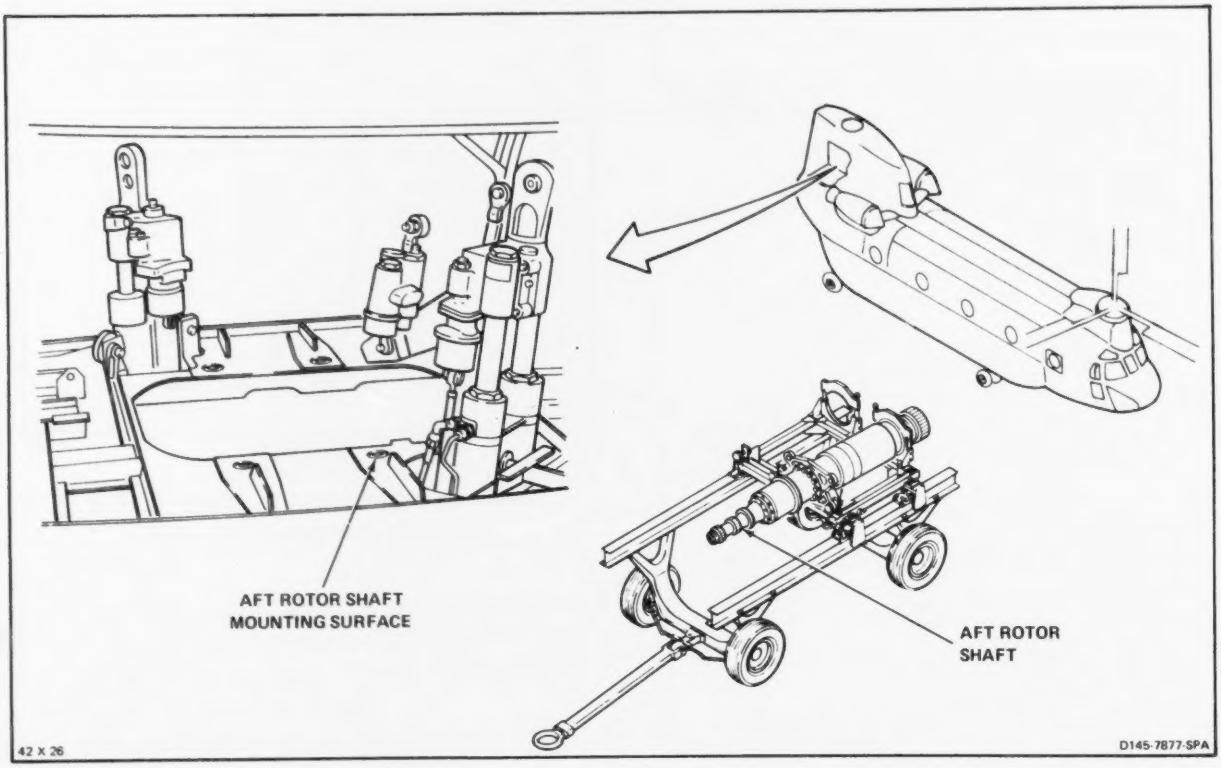
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Hoist Capable of Lifting 500 Pounds
Socket, 1-Inch, 3/4-Inch Drive
Torque Wrench, 100 to 750 Foot-Poounds
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Oil (E254)

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM55-1520-240-23P


AFT ROTOR SHAFT MOUNTING SURFACE
AFT ROTOR SHAFT
42 X 26
D145-7877-SPA

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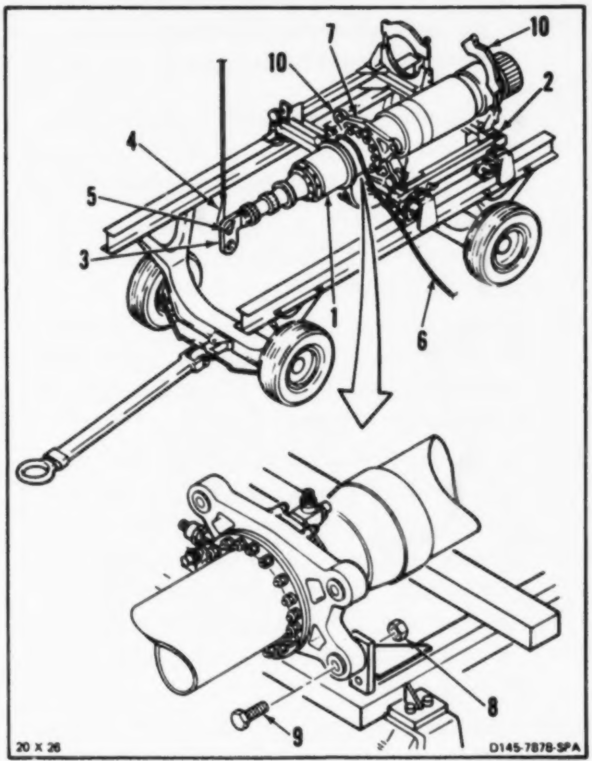
## 6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued) 6-62



1. Remove rotor shaft (1) from adapter (2) as follows:
   a. **Install hoisting eye (T32) (3)** in top of shaft (1).

   **NOTE**

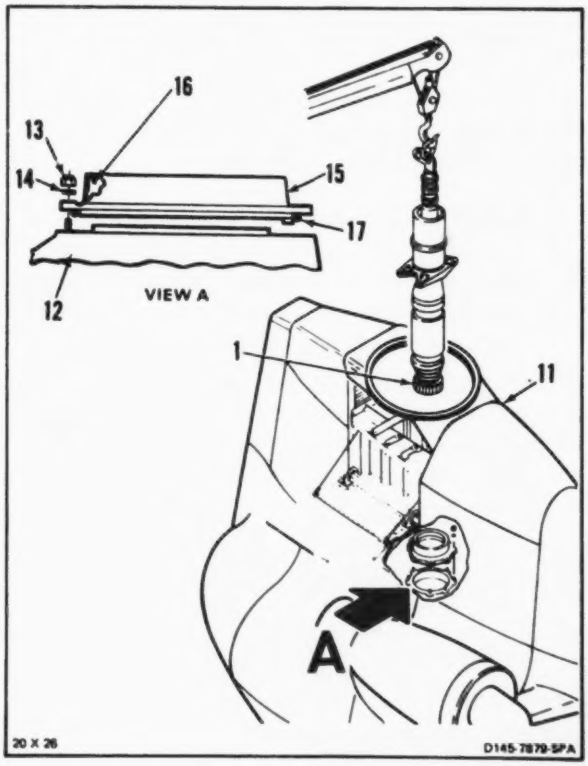
   AFT SHAFT hole must be used for proper shaft alignment during installation.

   b. **Connect hoist hook (4) to AFT SHAFT hole (5)** of hoisting eye (T32) (3). Raise hoist to **take up slack.** Do not apply tension.
   c. Attach rope guide line (6) to shaft (1), above bearing support (7).
   d. Remove two nuts (8) and bolts (9). Release clamp (10). Raise hoist to **lift shaft (1) out of adapter (2).**

**WARNING**

**Rotor shaft is heavy and can injure personnel if it drops. Shaft must be supported by hoist and moved carefully to prevent injury to personnel.**

2. **Position shaft (1) above center of pylon (11).**
3. Remove tape and barrier material from top of aft transmission (12). Remove ten nuts (13) and washers (14) from seal retainer (15). **Remove seal retainer.**
4. Check seal retainer (15), seal (16), and packing (17) for damage. There shall be no damage.
5. If applied, remove tape and barrier material from bottom of shaft (1).
6. **Coat seal (16) and mating surface of shaft (1) with oil (E254).**



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## 6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued) 6-62

**CAUTION**

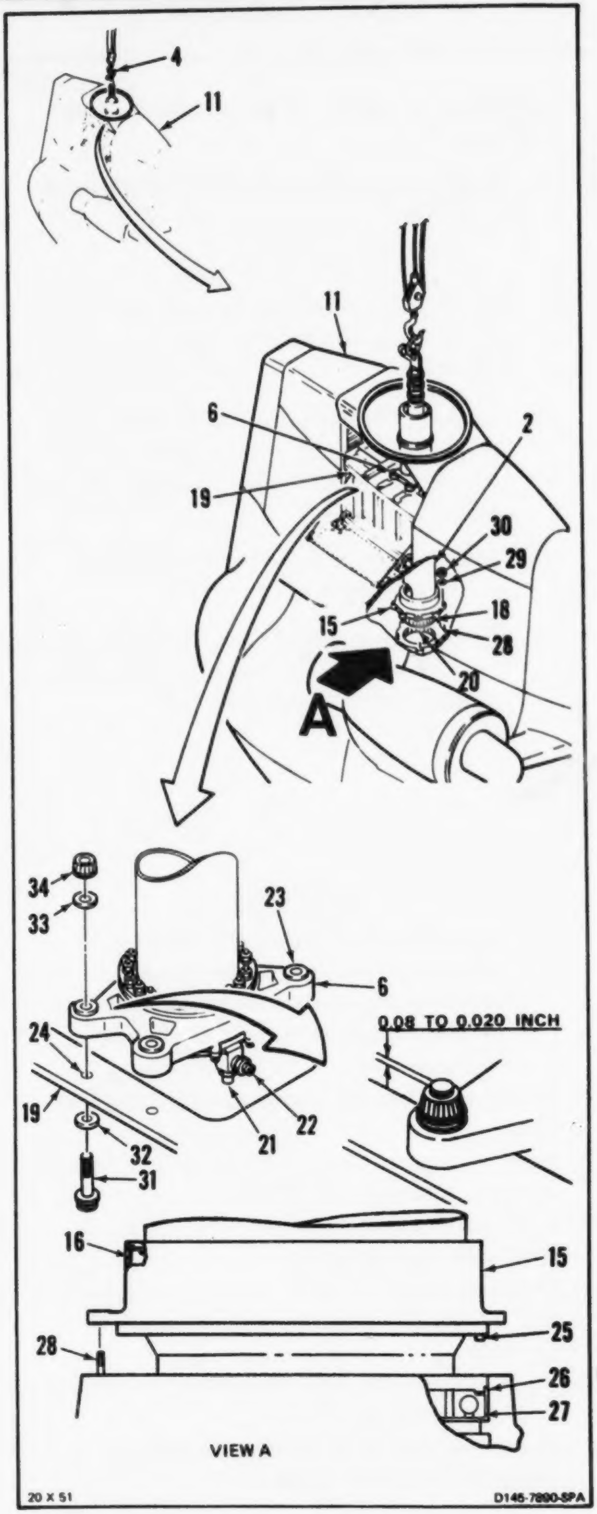
**Be careful when handling seal. Seal is easy to damage.**

7. **Install seal retainer (15)** on bottom of shaft (2).
8. **Coat splines (18) with oil (E254).**
9. **Lower shaft (2)** through pylon (11) and structure (19). **Align shaft splines (18)** with transmission splines (20).
10. Turn bearing support (6) so that chip detector (21) and union (22) point forward. **Align four mounting holes (23)** in support with holes (24) in structure (19).
11. **Align tab (25)** on retainer (15) **with slot (26)** on bearing outer race (27). Align retainer with ten studs (28) on transmission (12).
12. **Lower shaft (2) into transmission (12)** until retainer (15) is seated on top of transmission. Install ten washers (29) and nuts (30) on studs (28). **Torque nuts to 60 inch-pounds.**
13. Coat thread of four mounting bolts (31) with oil (E254). Install countersunk washer (32) on each bolt, with countersink against bolt head.

**NOTE**

Refer to Task 1-13, para 8, for re-use of self-locking nuts.

14. **Install four bolts (31),** from bottom, through structure (19) and bearing support (6). **Install four washers (33) and nuts (34).** When nuts are installed at least three turns, release tension on hook (4).
15. **Torque four nuts (34) to 375 foot-pounds.** Check each bolt (31). **Bolts shall extend 0.08 to 0.20 inch** through nuts (34). Use washers (33) of different thickness, as needed.



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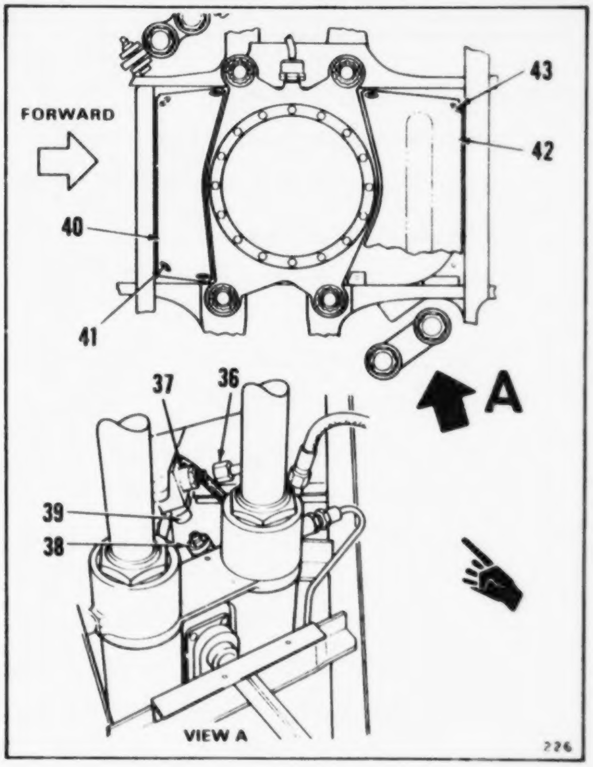
## 6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON (Continued) 6-62

16. **Connect drain hose (36)** to union (37). **Connect connector (38)** to chip detector (39).
17. **Install access panel (40).** Tighten four turnlock fasteners (41). Install access panel (42). Tighten four turnlock fasteners (43).


FORWARD
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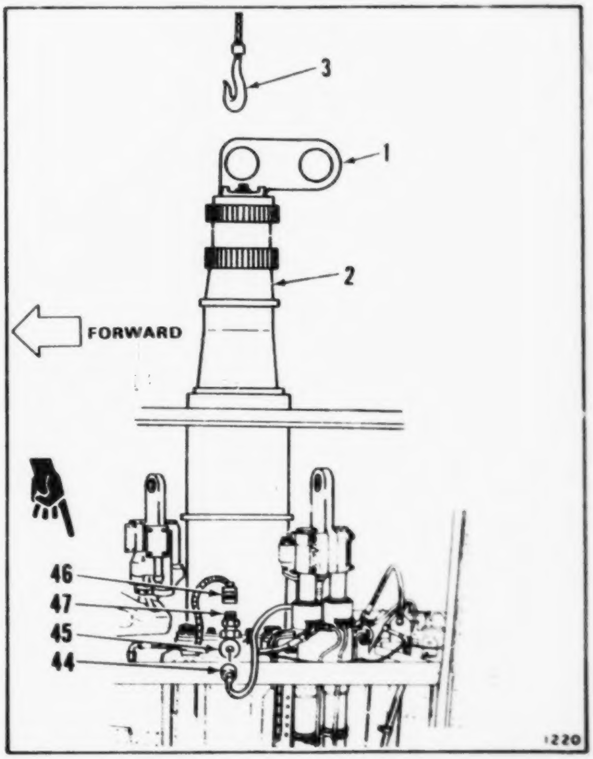
18. **Connect pressure hose (44)** to filter (45). **Connect connector (46)** to oil pressure switch (47).
19. Remove hook (3) and hoisting eye (1) from top of shaft (2).

***INSPECT***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1220

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## 6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON(Continued) 6-62

FOLLOW-ON MAINTENANCE:

Install swashplate (Task 5-133).

Install drive arms (Task 5-112).

Install drive collar (Task 5-111).

Install weather-protective cover (Task 5-138).

Install rotary-wing head (Task 5-9).

Check vertical pin angle (Task 11-58).

Install rotary-wing blades (Task 5-84).

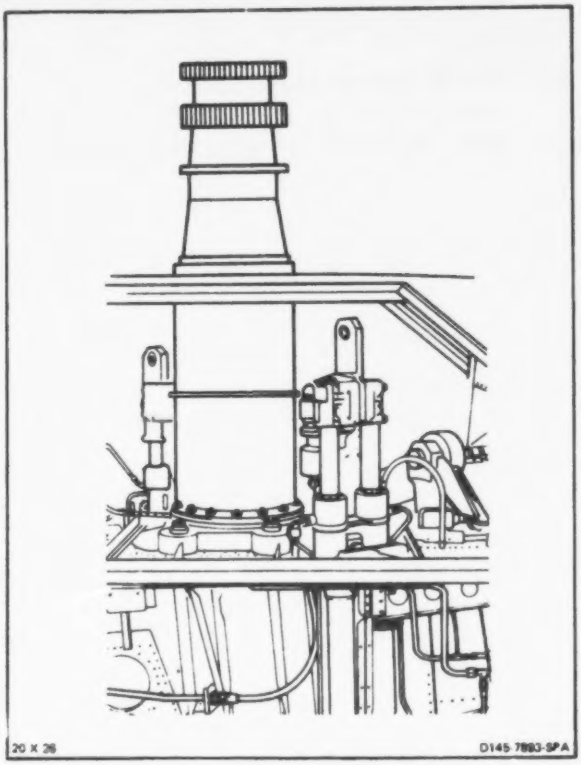
Phase rotary-wing system (Task 6-28).

Perform operational check of aft rotor shaft chip detector (TM 55-1520-240-T).

Close pylon work platforms (Task 2-2).

Service aft transmission with oil (Task 1-54).

Perform a ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-63 INSTALL AFT ROTOR SHAFT THROUGH CABIN 6-63

INITIAL SETUP

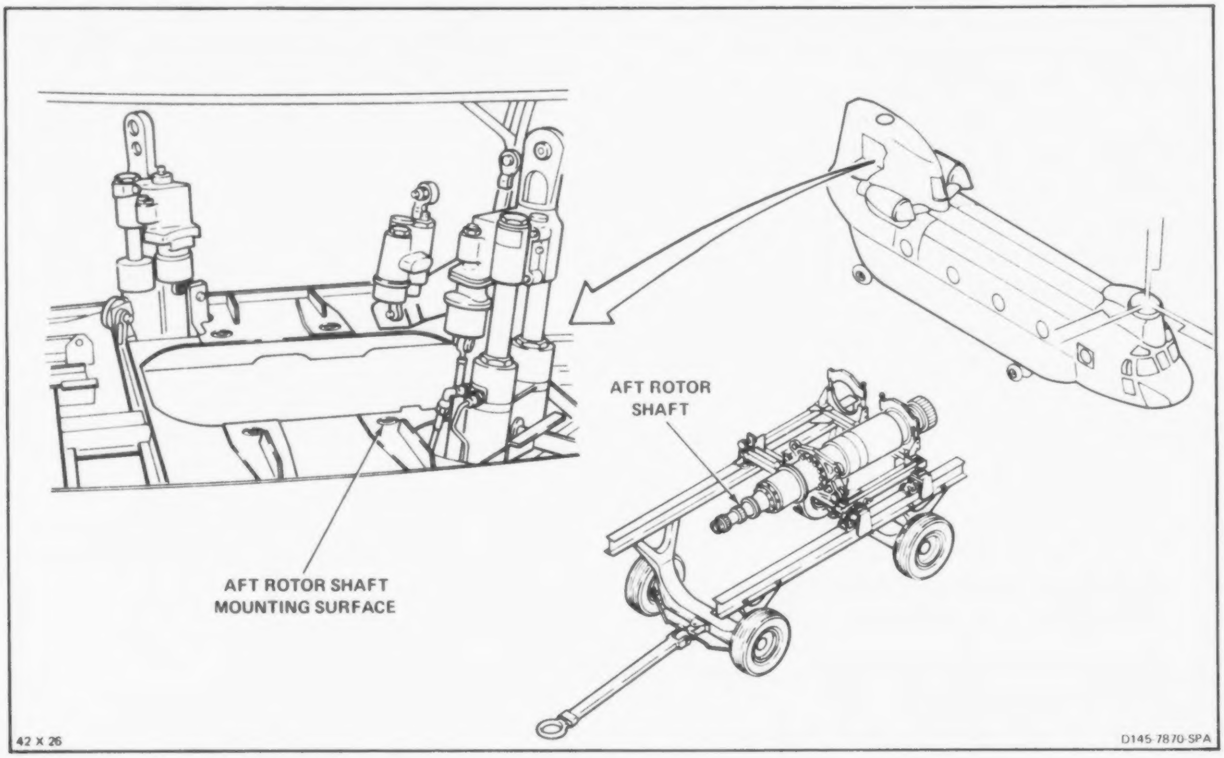
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Hoisting Eye (T32)
Hoist Capable of Lifting 500 Pounds
Socket, 1-Inch, 3/4-Inch Drive
Torque Wrench, 100 to 750 Foot-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Oil (E254)

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P
TM 55-1520-240-T


AFT ROTOR SHAFT
AFT ROTOR SHAFT MOUNTING SURFACE
42 X 26
D145-7870-SPA

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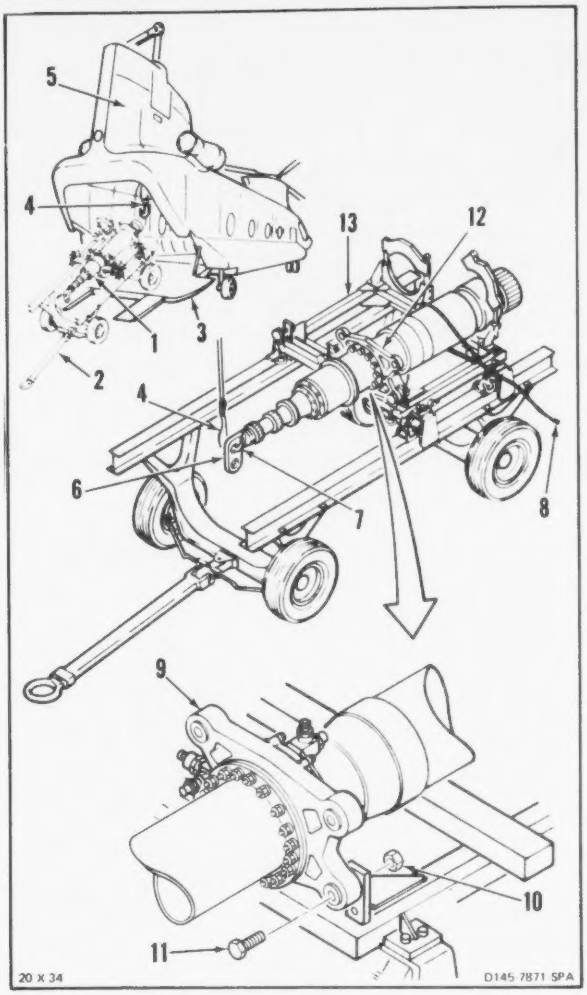
## 6-63 INSTALL AFT ROTOR SHAFT THROUGH CABIN (Continued) 6-63

1. Position rotor shaft (1), in transportation trailer 2000 (2), on cargo ramp (3). Raise cargo ramp to level (TM 55-1520-240-T).
2. Lower work hoist hook (4) through pylon (5) to rotor shaft (1).
3. Install hoisting eye (T32) (6) in top of shaft (1).

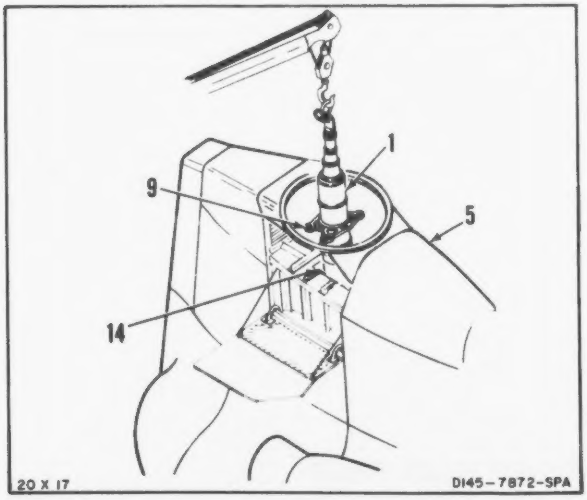
**NOTE**

AFT SHAFT hole must be used for proper shaft alignment during installation.

4. **Connect hoist hook (4) to AFT SHAFT hole (7)** of hoisting eye (T32) (6). Raise hoist to **take up slack.** Do not apply tension.
5. Attach rope guide line (8) to shaft (1) below bearing support (9).
6. Remove two nuts (10) and bolts (11). Release clamp (12). Raise hoist to **lift shaft (1)** out of adapter (13).



7. **Turn bearing support (9)** so that it fits through hole (14) in pylon (5).
8. **Raise shaft (1) so that bearing support (9) is above hole (14).**



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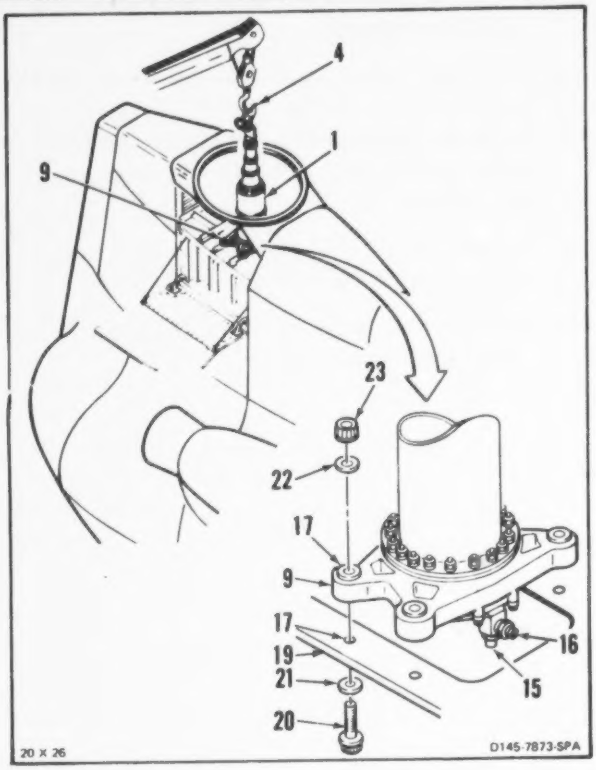
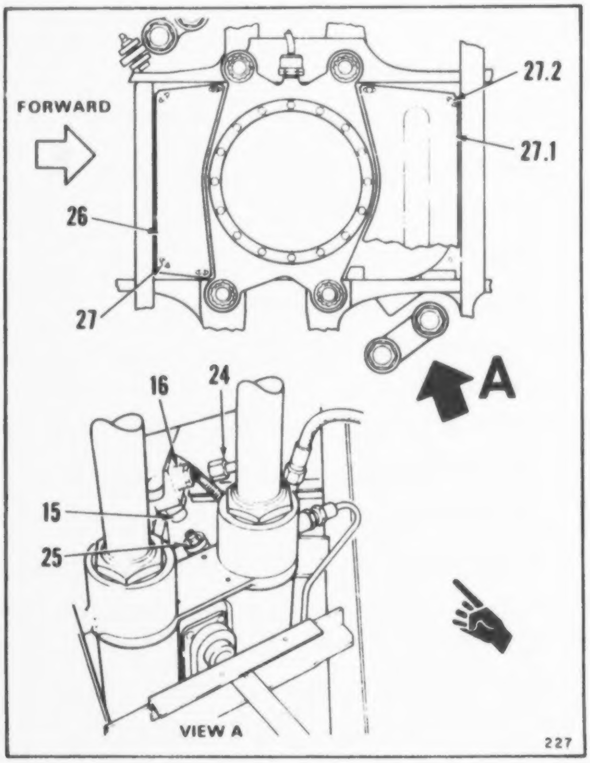
## 6-63 INSTALL AFT ROTOR SHAFT THROUGH CABIN (Continued) 6-63

9. **Turn bearing support (9)** so that chip detector (15) and union (16) point forward. **Align four mounting holes (17)** in support (9) with holes (18) in structure (19).
10. **Lower shaft (1)** until bearing support (9) rests on structure (19).
11. Coat thread of four mounting bolts (20) with oil (E254). Install countersunk washer (21) on each bolt, with countersink against bolt head.
12. **Install four bolts (20),** from bottom, through structure (19) and bearing support (9). **Install four washers (22) and nuts (23).** When nuts are installed at least three turns, release tension on hook (4).
13. **Torque four nuts (23) to 375 foot-pounds.** Check each bolt (20). **Bolts shall extend 0.08 to 0.20 inch** through nuts (23). Use washers (22) of different thickness as needed.



14. **Connect drain hose (24)** to union (16). **Connect connector (25)** to chip detector (15).
15. **Install access panel (26).** Tighten four turnlock fasteners (27). Install access panel (27.1). Tighten four turnlock fasteners (27.2).



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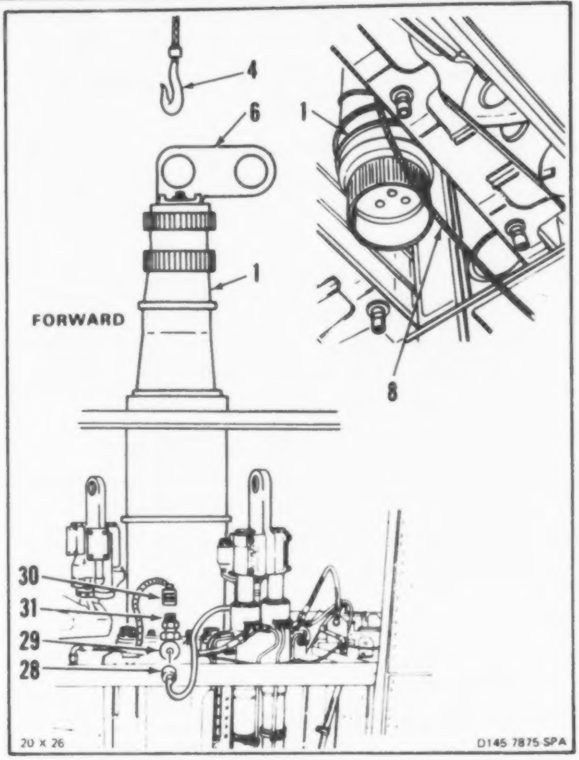
## 6-63 INSTALL AFT ROTOR SHAFT THROUGH CABIN (Continued) 6-63

16. **Connect pressure hose (28)** to filter (29). **Connect connector (30)** to oil pressure switch (31).
17. Remove hook (4) and hoisting eye (6) from top of shaft (1).
18. Remove rope guide line (8) from around bottom of rotor shaft (1).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install aft transmission (Task 6-97).

Service aft transmission with oil (Task 1-54).

Install swashplate (Task 5-133).

Install drive arms (Task 5-112).

Install drive collar (Task 5-111).

Install weather-protective cover (Task 5-138).

Install rotary-wing head (Task 5-9).

Check vertical pin angle (Task 11-58).

Install rotary-wing blades (Task 5-84).

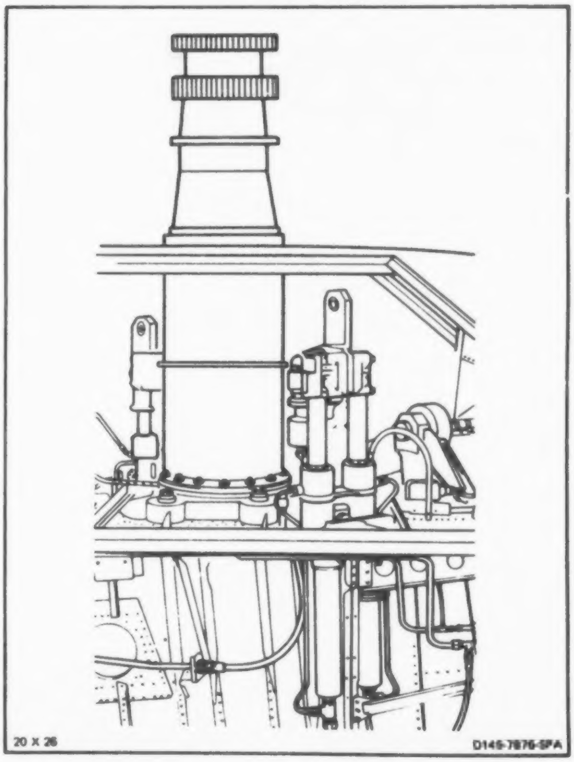
Phase rotary-wing system (Task 6-28).

Perform operational check of aft rotor shaft chip detector (TM 55-1520-240-T).

Close pylon work platforms (Task 2-2).

Perform a ground run (TM 55-1520-240-10).

**END OF TASK**



# SECTION V
# ENGINE COMBINING TRANSMISSION

## 6-64 REMOVE COMBINING TRANSMISSION INPUT SHAFT OIL SEAL 6-64

INITIAL SETUP

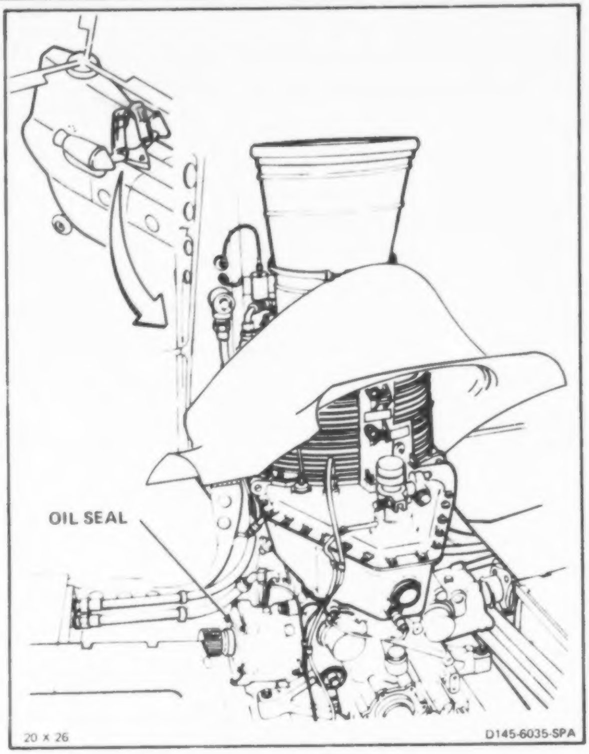
***Applicable Configurations:***
All

***Tools:***
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
1/4-28 Bolt, At Least One-Inch Long (3)

***Materials:***
None

***Personnel Required:***
68D20 Aircraft Powertrain Repairer

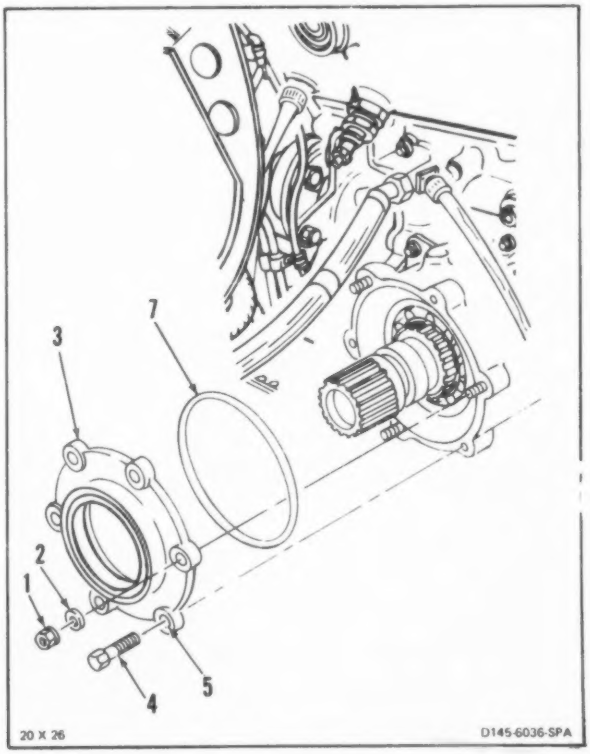
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft and Combining Transmission Adapter Assembly Removed (Task 6-30)



**NOTE**

Procedure is same to remove seal from left or right input shaft. Removal of left shaft seal is shown here.

1. Remove three nuts (1) and washers (2) from retainer (3).
2. Install three 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



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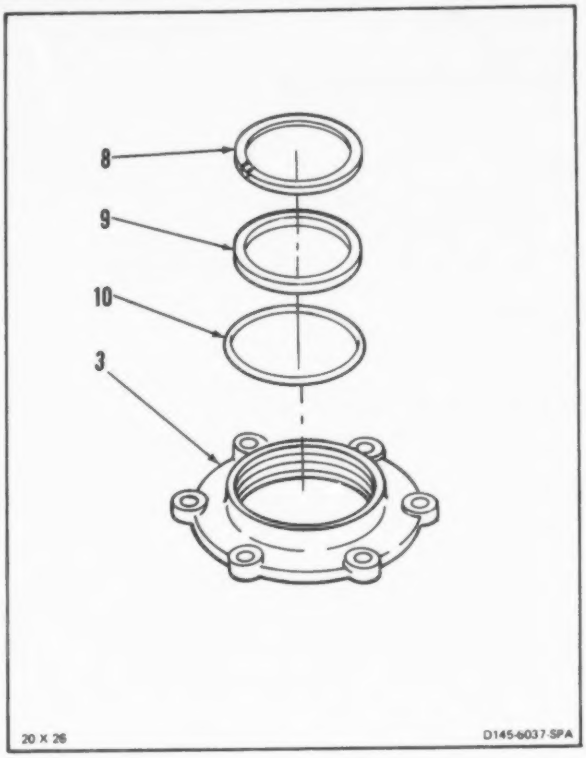
## 6-64 REMOVE COMBINING TRANSMISSION INPUT SHAFT OIL SEAL (Continued) 6-64

4. Remove retaining ring (8) from retainer (3). **Remove seal (9)** and packing (10).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D145-6037-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-65 INSTALL COMBINING TRANSMISSION INPUT SHAFT OIL SEAL 6-65

INITIAL SETUP

***Applicable Configurations:***
All

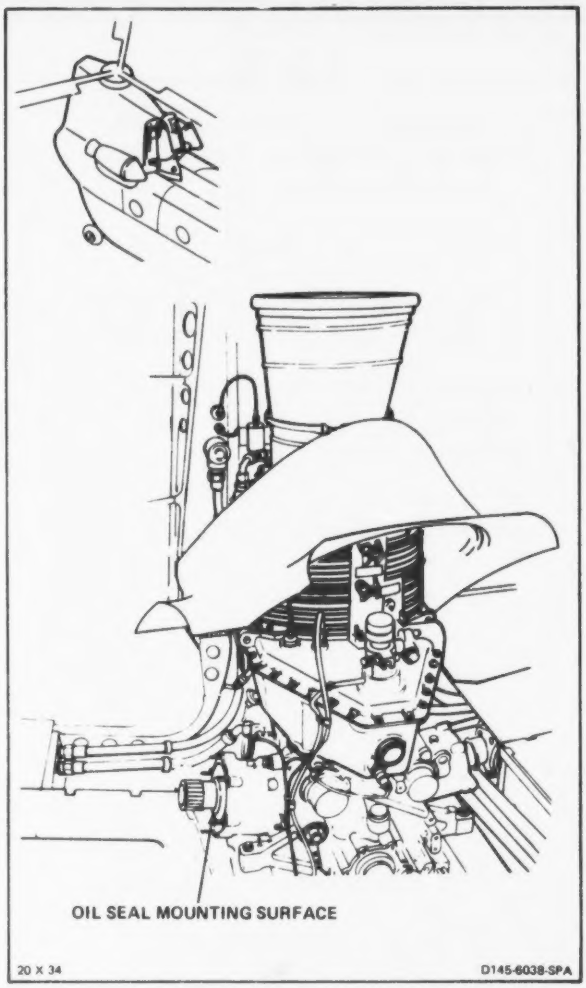
***Tools:***
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 3-Inch OD, 1/8-Inch-Thick Wall, 1 to 6-Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

***Materials:***
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

***Parts:***
Packings

***Personnel Required:***
Aircraft Powertrain Repairer
Inspector

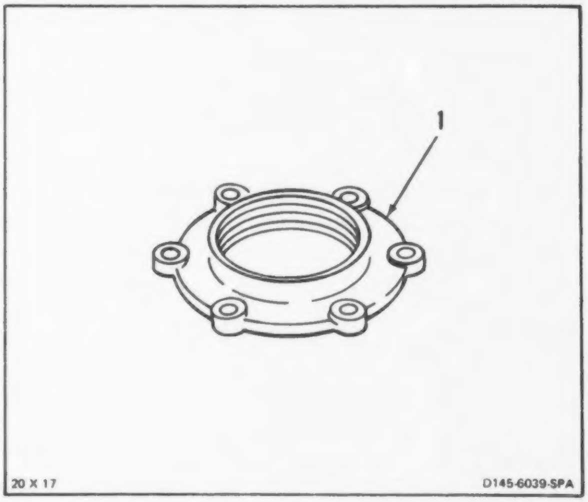
***References:***
TM 55-1520-240-23P



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).



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## 6-65 INSTALL COMBINING TRANSMISSION INPUT SHAFT OIL SEAL (Continued) 6-65

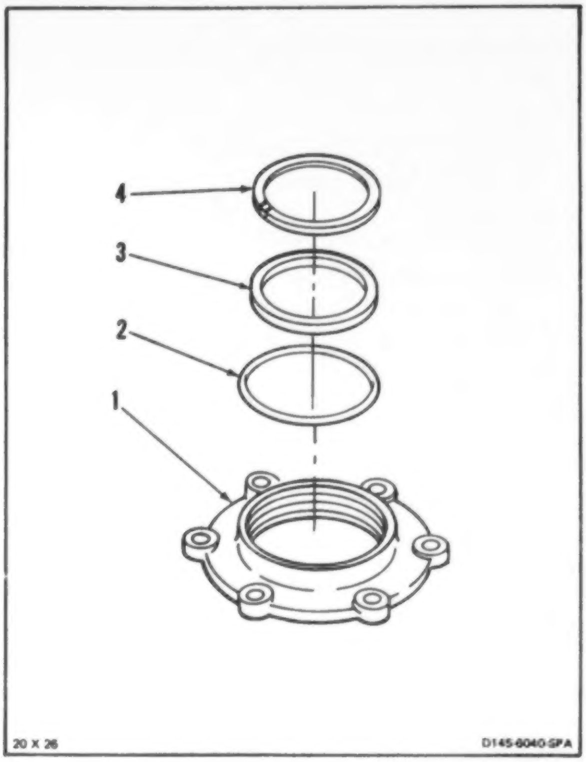
**WARNING**

**Wear Kevlar gloves when handling hot retainer. Hot retainer can cause burns.**

**CAUTION**

**Do not heat retainer over 250°F (120°C). Metal can be damaged.**

2. **Heat retainer (1)** to 230° to 250°F (110° to 120°C). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).

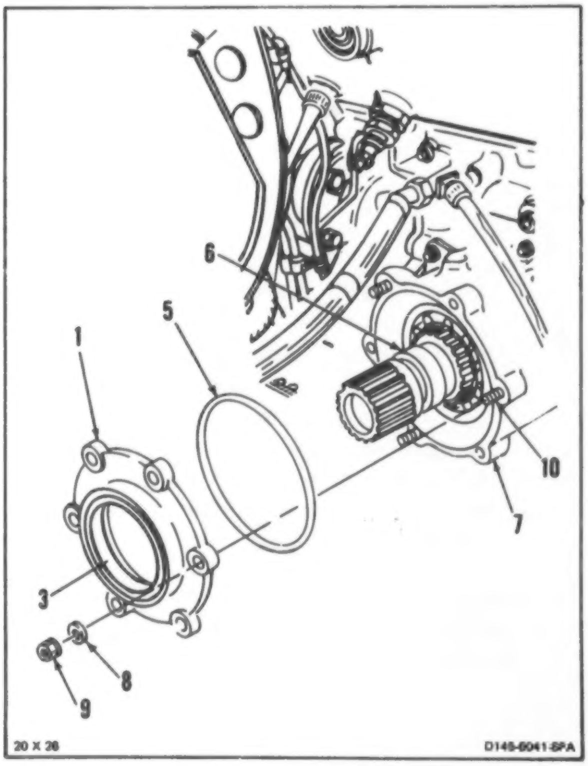


**NOTE**

Procedure is same to install retainer on left or right input shaft. Installation on left shaft is shown here.

6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on transmission (7).
8. **Install** six washers (8) and **nuts (9)** on studs (10). **Torque nuts to 60 inch-pounds.**

***INSPECT***



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## 6-65 INSTALL COMBINING TRANSMISSION INPUT SHAFT OIL SEAL (Continued) 6-65

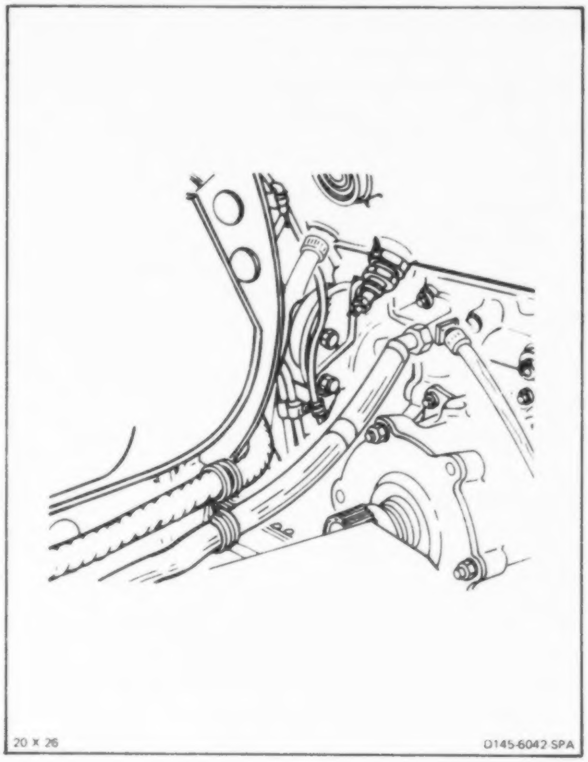
FOLLOW-ON MAINTENANCE:

Install combining transmission adapter assembly and engine drive shaft (Task 6-32).

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-66 REMOVE COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL 6-66

INITIAL SETUP

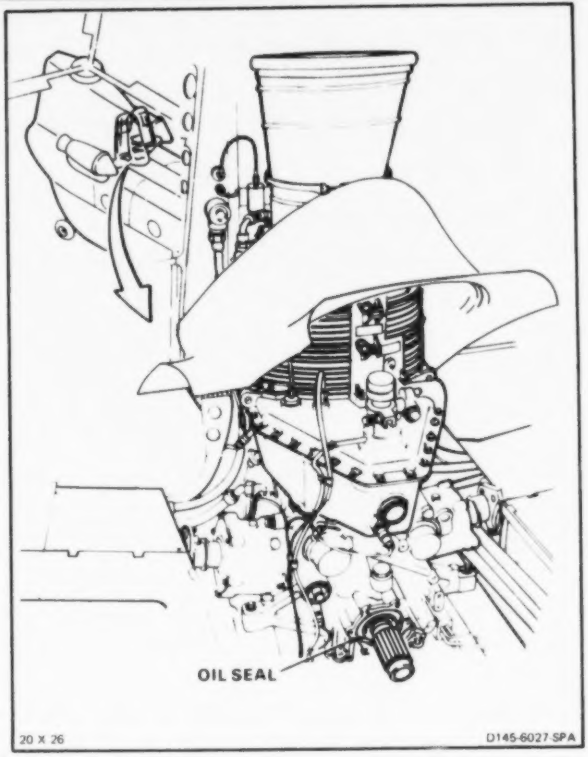
***Applicable Configurations:***
All

***Tools:***
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
1/4-28 Bolt, At Least One-Inch Long (2)

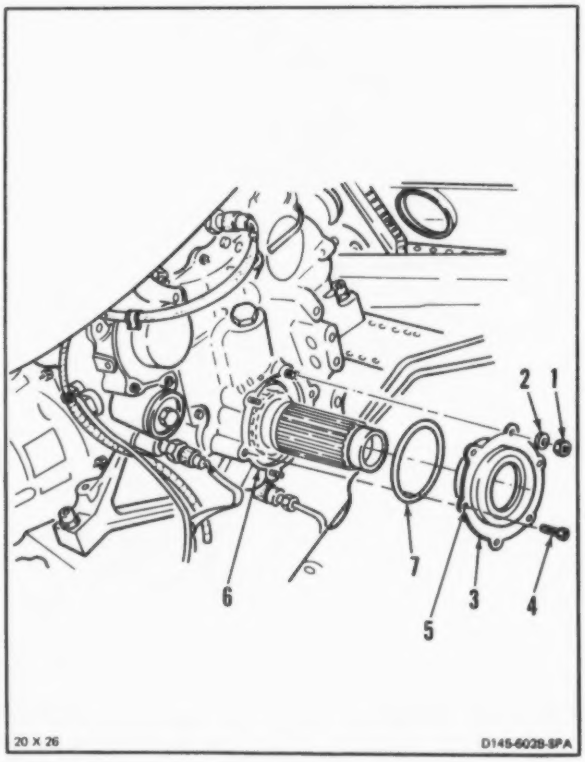
***Materials:***
None

***Personnel Required:***
68D20 Aircraft Powertrain Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)
No. 7 Drive Shaft Removed (Task 6-4)
Combining Transmission Forward Adapter Assembly Removed (Task 6-5)



1. Remove four nuts (1) and washers (2) from retainer (3).
2. Install two 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



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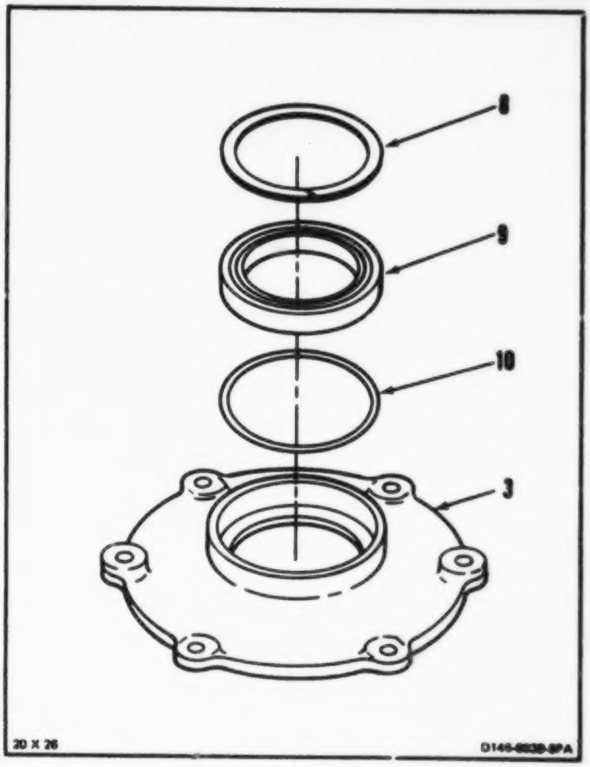
## 6-66 REMOVE COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL (Continued) 6-66

4. Remove retaining ring (8) from retainer (3). **Remove seal (9)** and packing (10).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D146-6039-8PA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-67 INSTALL COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL 6-67

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 3 1/2-Inch OD, 1/8-Inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

***Materials:***

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

***Parts:***

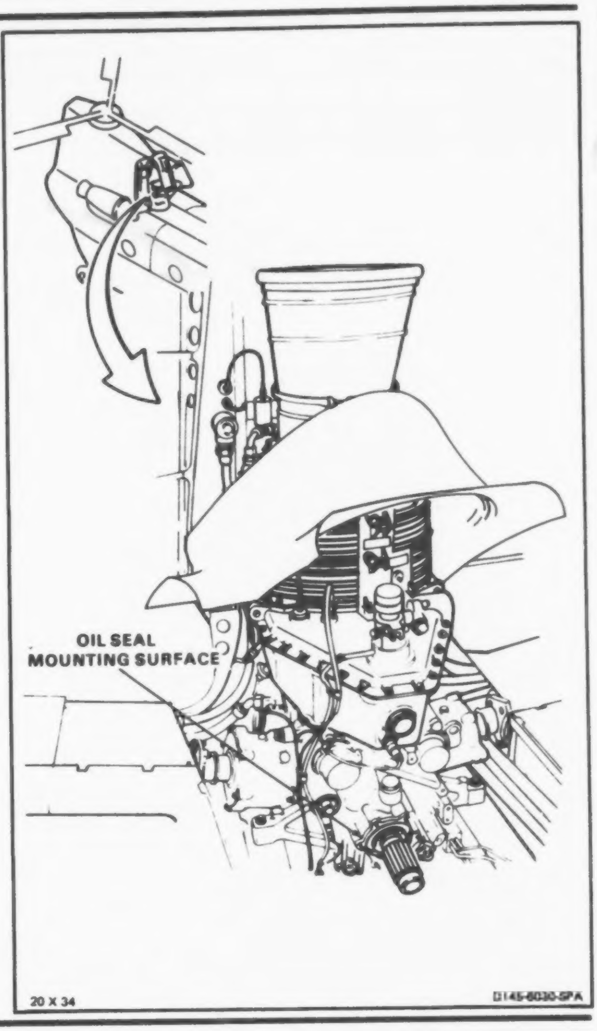
Packings

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1520-240-23P



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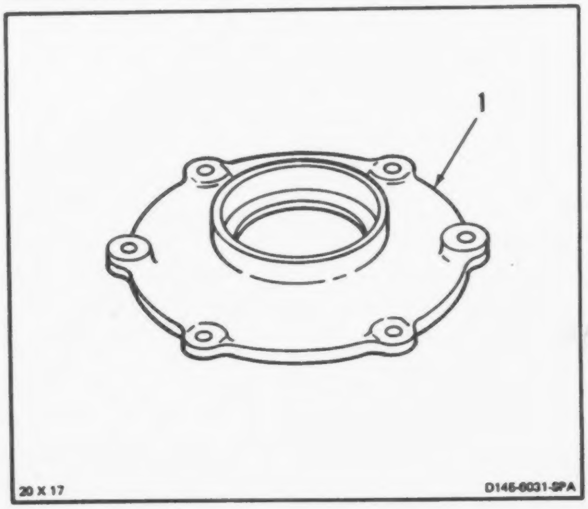
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).



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## 6-67 INSTALL COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL (Continued) 6-67

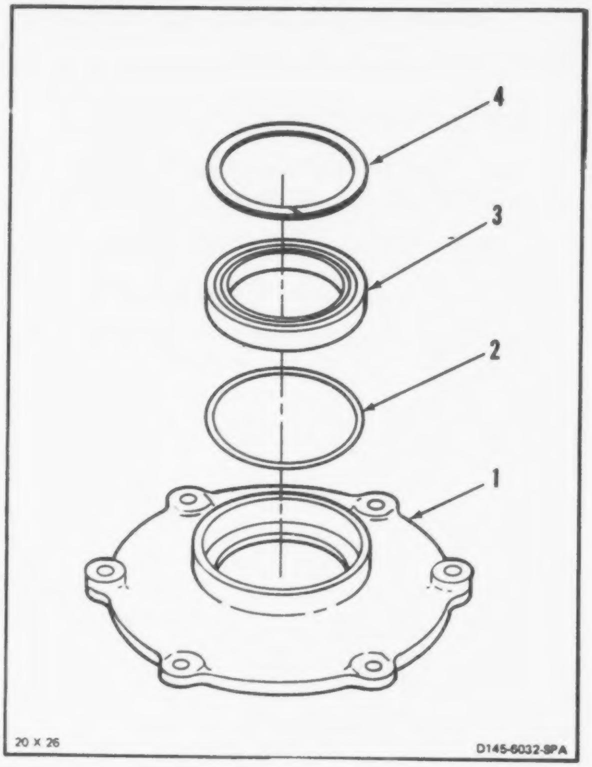
**WARNING**

**Wear Kevlar gloves when handling hot retainer. Hot retainer can cause burns.**

**CAUTION**

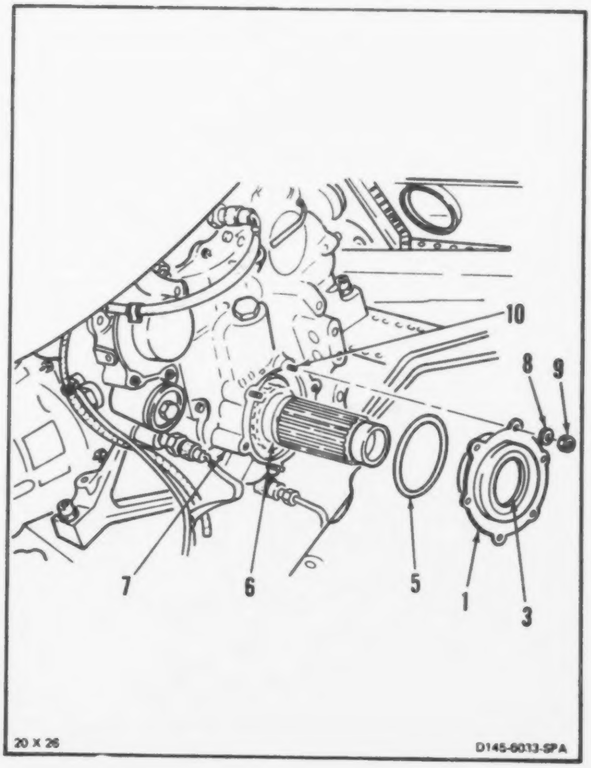
**Do not heat retainer over 250°F (120°C). Metal can be damaged.**

2. **Heat retainer (1)** to 230° to 250°F (110° to 120°C). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on transmission (7).
8. **Install** four washers (8) and **nuts (9)** on studs (10). **Torque nuts to 60 inch-pounds.**

***INSPECT***



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## 6-67 INSTALL COMBINING TRANSMISSION FORWARD OUTPUT SHAFT OIL SEAL (Continued) 6-67

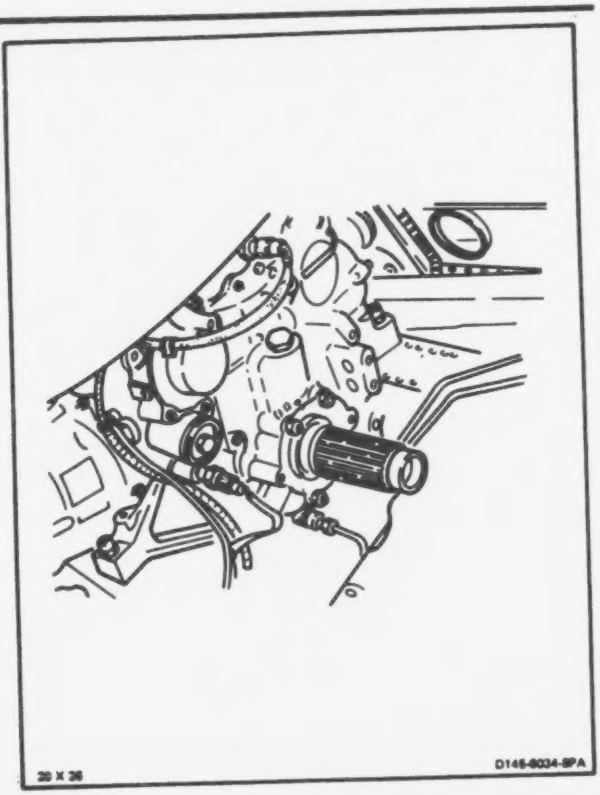
FOLLOW-ON MAINTENANCE:

Install combining transmission forward adapter assembly (Task 6-8).

Install No. 7 drive shaft (Task 6-19).

Close aft pylon lower fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-68 REMOVE COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL 6-68

INITIAL SETUP

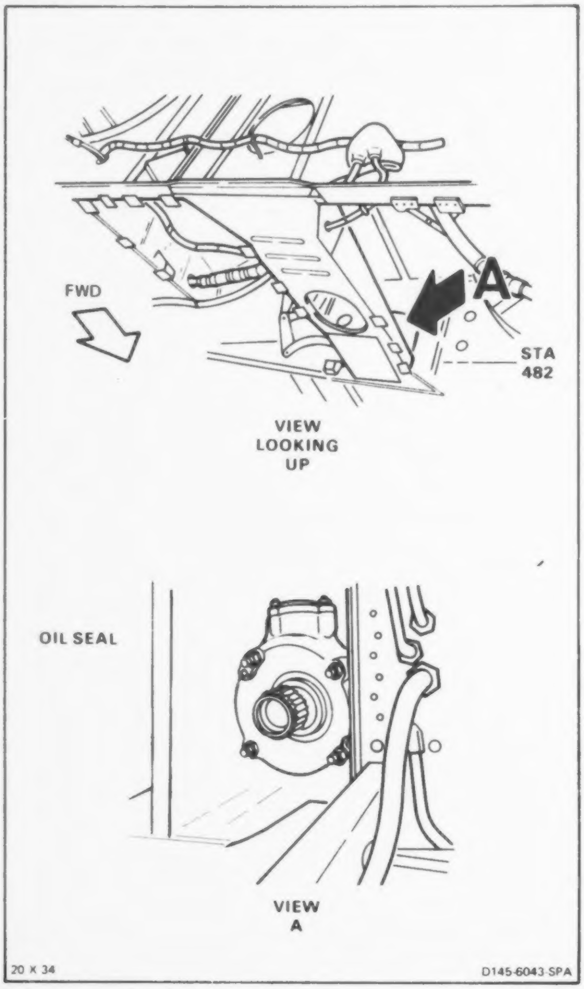
***Applicable Configurations:***
All

***Tools:***
Powertrain Repairer's Tool Kit,
NSN 5180-00-003-5267
1/4-28 Bolt, At Least One-Inch Long (2)

***Materials:***
None

***Personnel Required:***
68D20 Aircraft Powertrain Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Drive Shafting Removed (Task 6-21)
Combining Transmission Aft Adapter Assembly Removed (Task 6-22)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OIL SEAL
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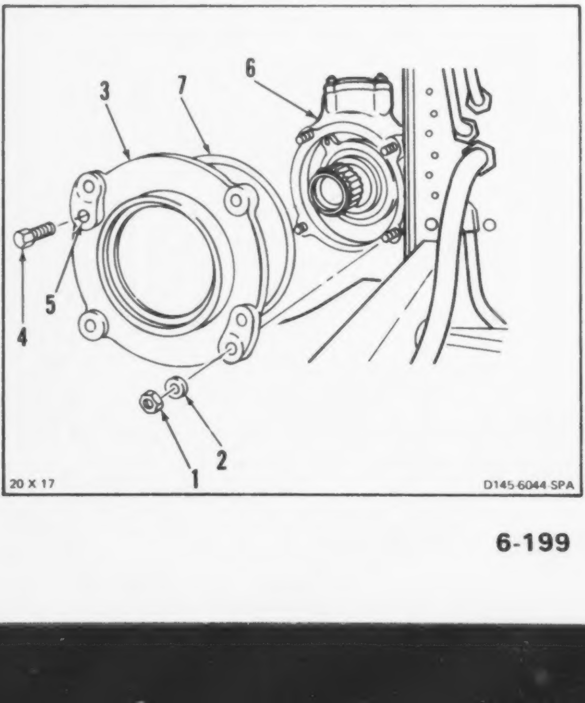
D145-6043-SPA

1. Remove four nuts (1) and washers (2) from retainer (3).
2. Install two 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).


3
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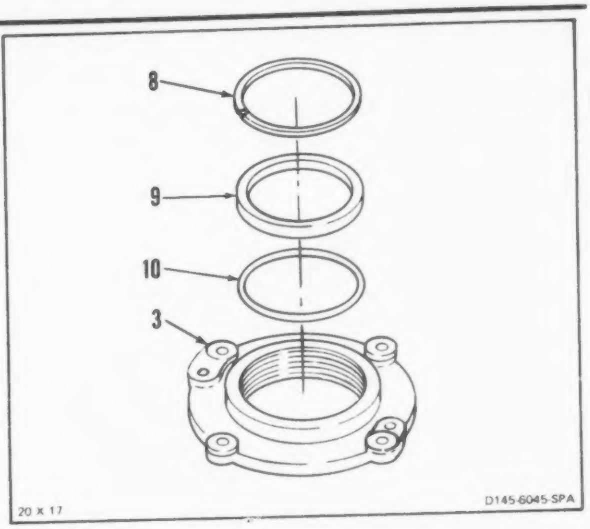
D145-6044-SPA

***GO TO NEXT PAGE***

## 6-68 REMOVE COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL (Continued)

4. Remove retaining ring (8) from retainer (3). **Remove seal (9) and packing (10).**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D145-6045-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-69 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL 6-69

INITIAL SETUP

***Applicable Configurations:***
All

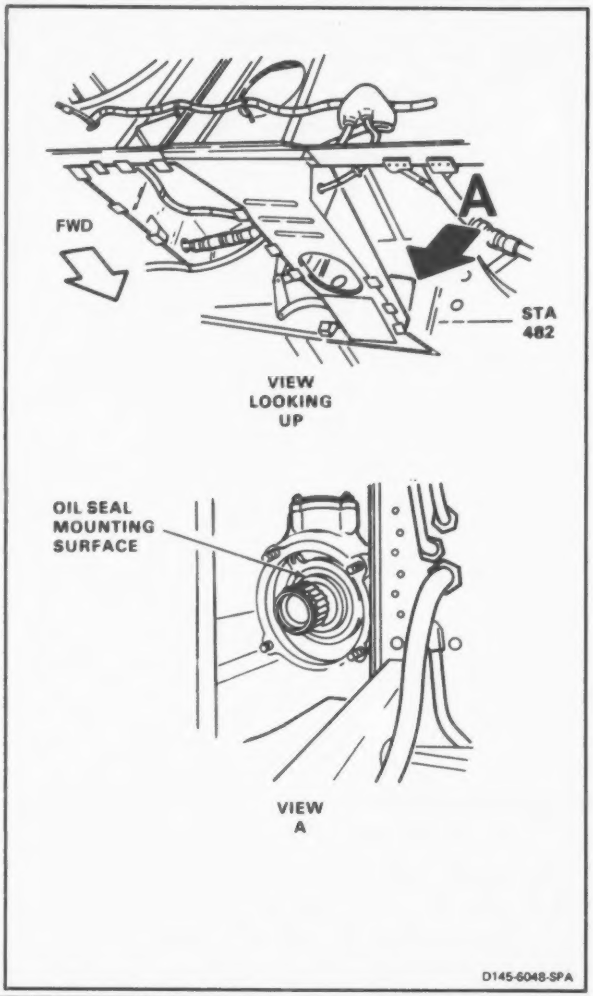
***Tools:***
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 3 1/2-Inch OD, 1/8-Inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

***Materials:***
Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

***Parts:***
Packings

***Personnel Required:***
Aircraft Powertrain Repairer
Inspector

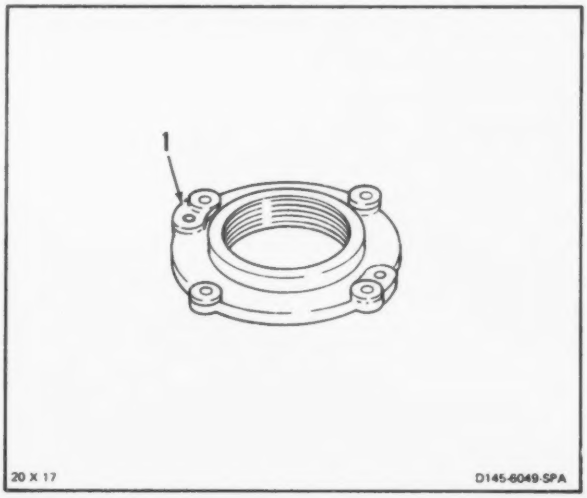
***References:***
TM 55-1520-240-23P



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186) and goggles.



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## 6-69 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL (Continued) 6-69

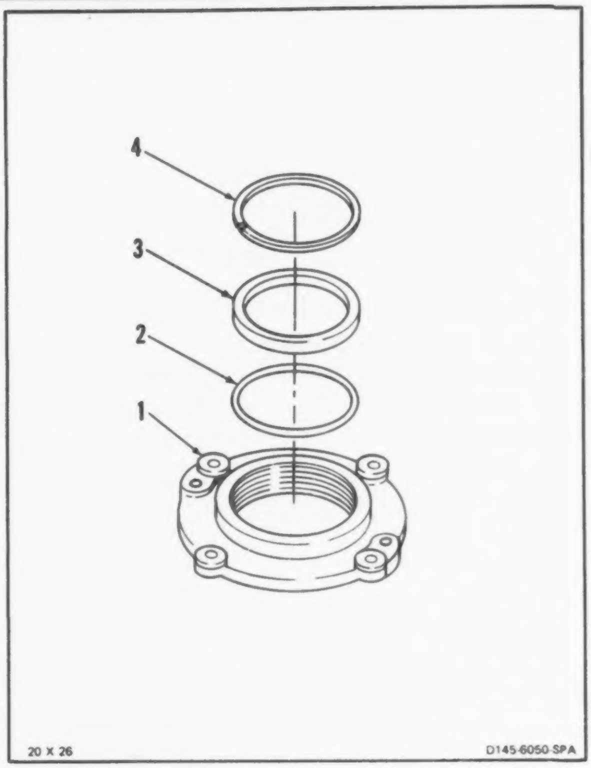
**WARNING**

**Wear Kevlar gloves when handling hot retainer. Injury to hands can occur.**

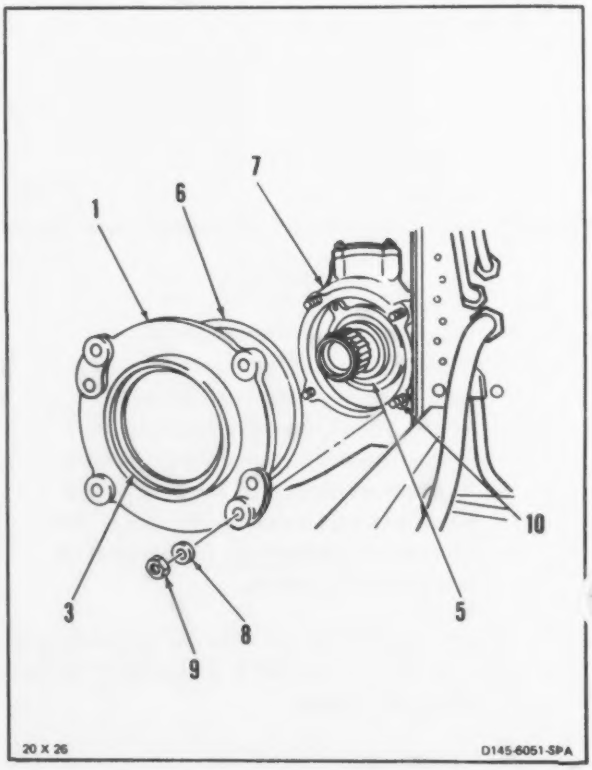
**CAUTION**

**Do not heat retainer over 250°F (120°C). Metal can be damaged.**

2. Heat retainer (1) to 230 to 250°F (110 to 120°C). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on transmission (7).
8. Install four washers (8) and nuts (9) on studs (10). **Torque nuts to 60 inch-pounds.**



***INSPECT***

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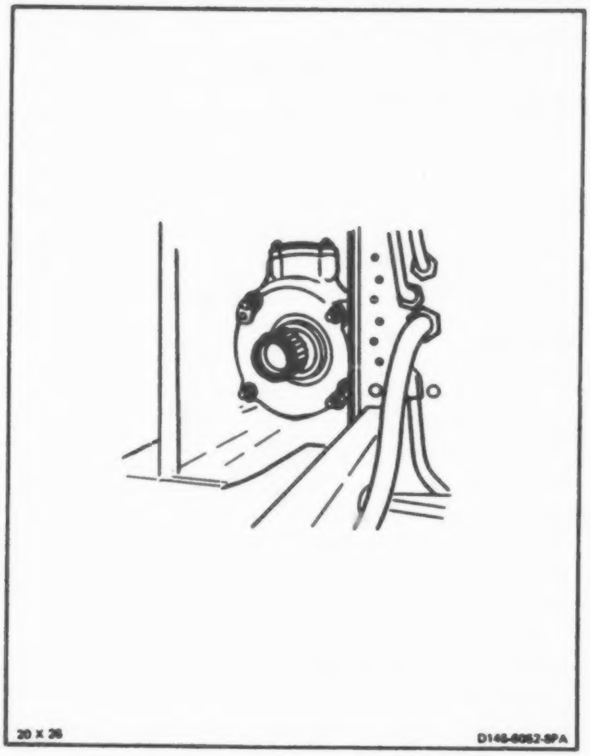
## 6-69 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT OIL SEAL (Continued) 6-69

FOLLOW-ON MAINTENANCE:

Install combining transmission aft adapter assembly (Task 6-24).

Install aft drive shafting (Task 6-29).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

# 6-70 REMOVE COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL 6-70

INITIAL SETUP

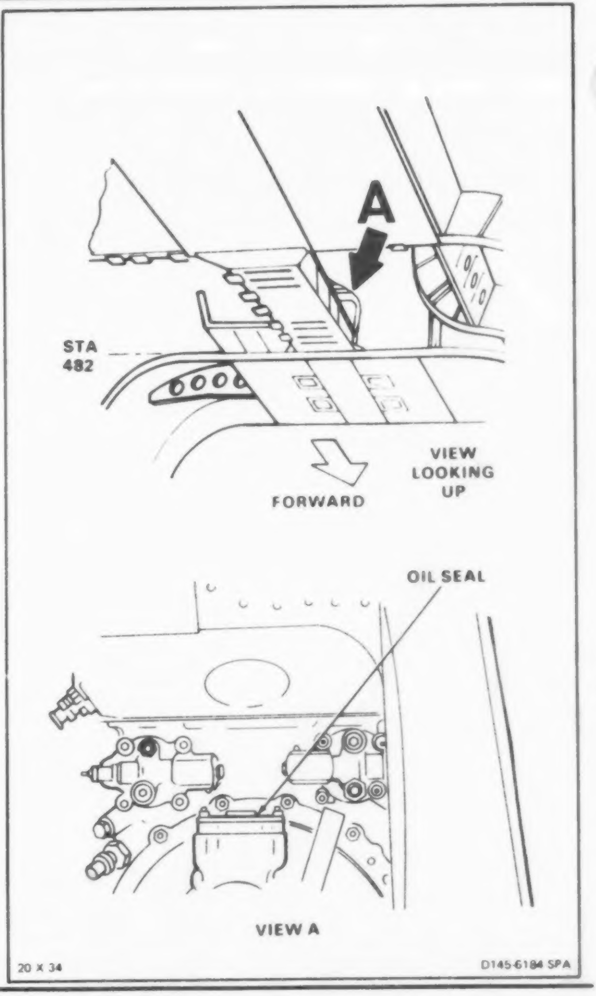
***Applicable Configurations:***
All

***Tools:***
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Workstand

***Materials:***
None

***Personnel Required:***
Aircraft Powertrain Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Oil Cooler, Fan and Drive Shaft Removed (Task 6-182)
Cargo Ramp Open and Level (TM 55-1520-240-T)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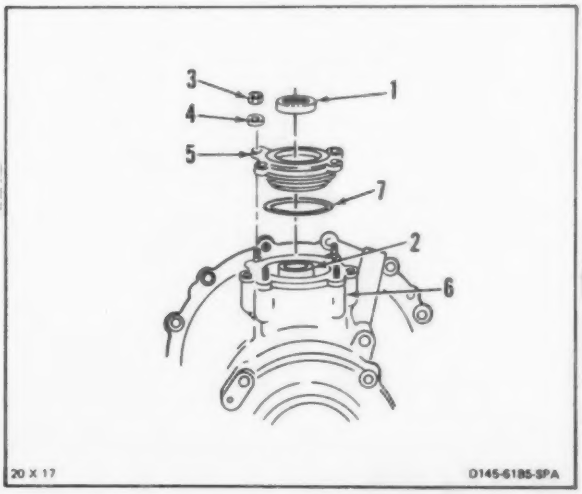
1. Remove snubber (1) from end of shaft (2).
2. Remove four nuts (3) and washers (4) from seal retainer (5). **Pry retainer** off transmission (6).
3. Remove packing (7) from retainer (5).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D145-6185-SPA

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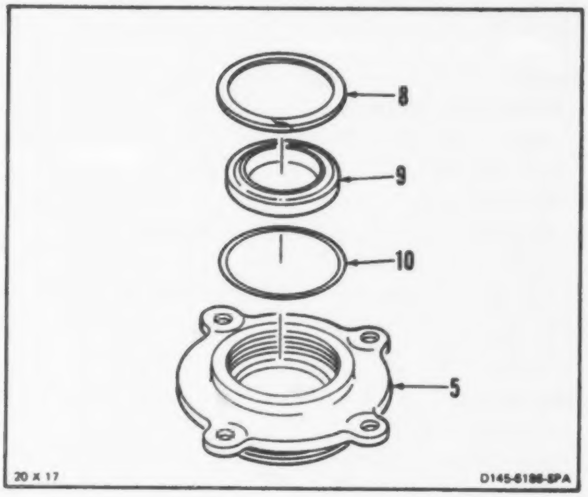
## 6-70 REMOVE COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued) 6-70

4. Remove retaining ring (8) from retainer (5). **Remove seal (9)** and packing (10).


8
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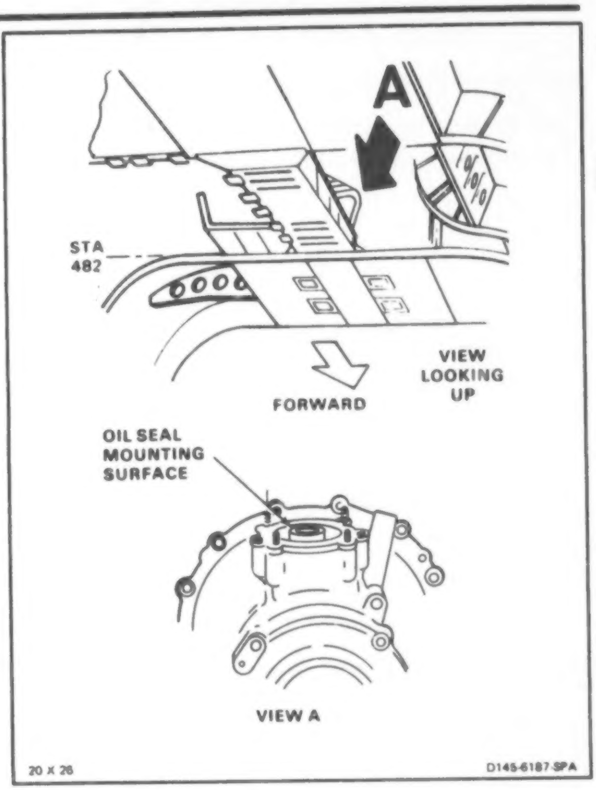
D145-6186-5PA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

# 6-71 INSTALL COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL 6-71


A
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FORWARD
VIEW LOOKING UP
OIL SEAL MOUNTING SURFACE
VIEW A
20 X 26
D145-6187-SPA

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 2-Inch OD, 1/8-Inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)
Workstand

***Materials:***

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Grease (E190)

***Parts:***

Packing

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1520-240-23P

***Equipment Condition:***

Inspect Snubber (Task 6-185)

***GO TO NEXT PAGE***

## 6-71 INSTALL COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued) 6-71

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

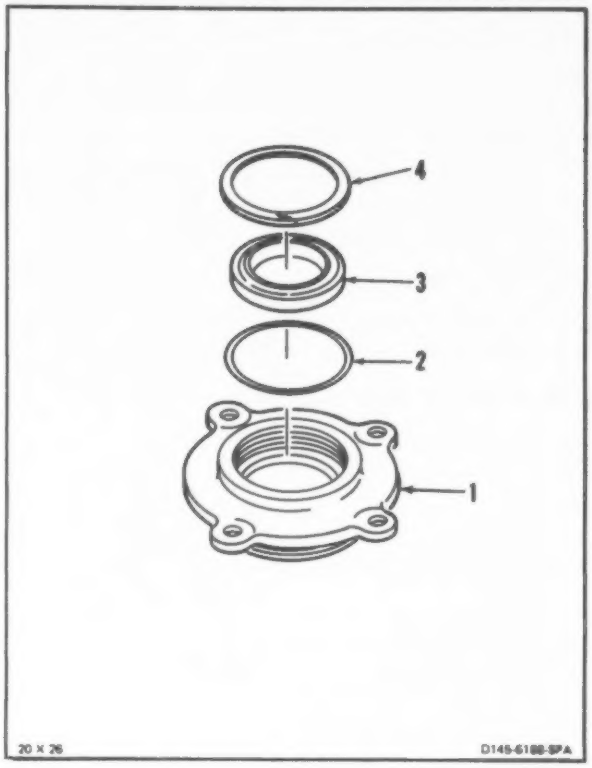
**WARNING**

**Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.**

**CAUTION**

**Do not heat retainer over 250°F (120°C). Metal can be damaged.**

2. **Heat retainer (1)** to 230 to 250°F (110 to 120°C). Use gun-type heater and pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube to seat seal.
5. **Install retaining ring (4).**



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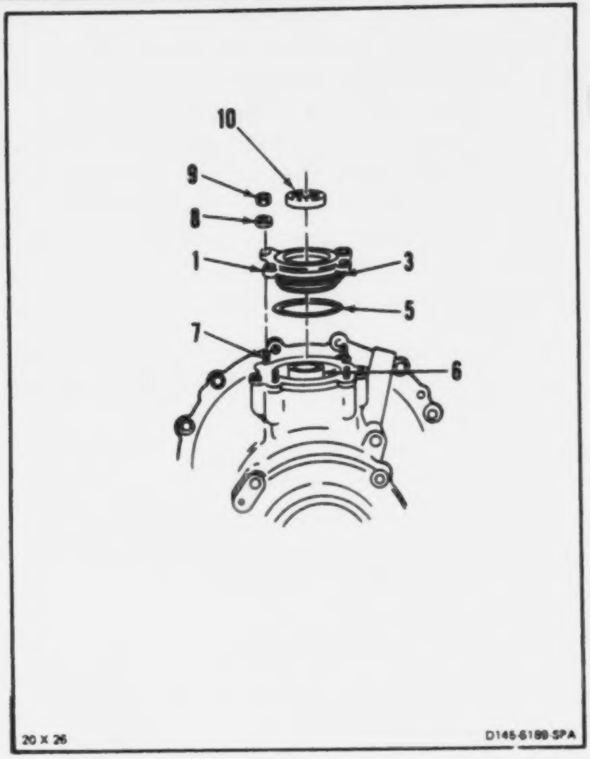
## 6-71 INSTALL COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued) 6-71

6. Coat packing (5) with oil (E254). Install packing (5) on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). **Install retainer (1)** on four studs (7).
8. Install four washers (8) and nuts (9) on studs (7). **Torque nuts to 60 inch-pounds.**
9. Install snubber (10) on end of shaft (6).

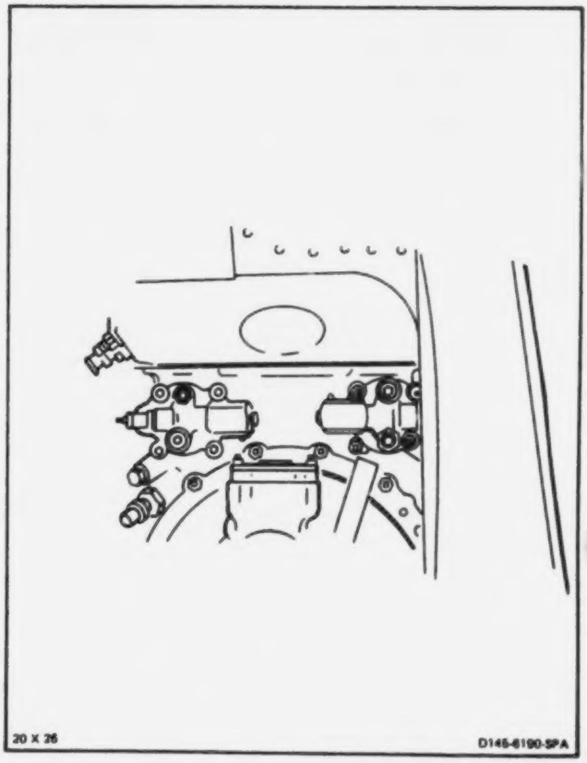


***INSPECT***

FOLLOW-ON MAINTENANCE:

Install oil cooler fan and drive shaft (Task 6-186).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-71.1 CLEAN AND INSPECT COMBINING TRANSMISSION OIL FILLER SCREEN 6-71.1

INITIAL SETUP

***Applicable Configurations:***
All

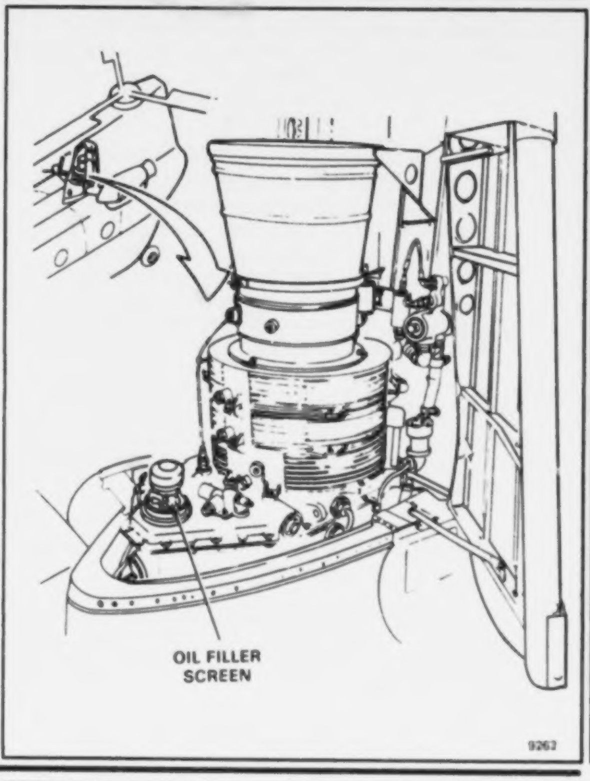
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
Task 6-108
TM 55-1520-240-23P

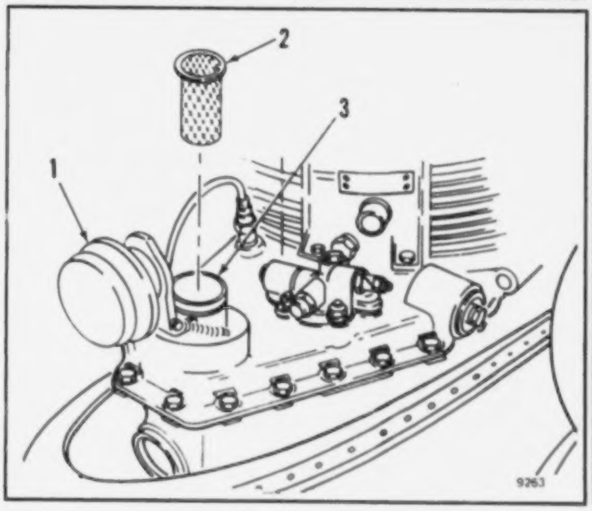
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)



**WARNING**

**Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.**

1. Open cap assembly (1). **Remove screen (2)** from neck (3) of filler.
2. Close cap assembly (1).



**GO TO NEXT PAGE**

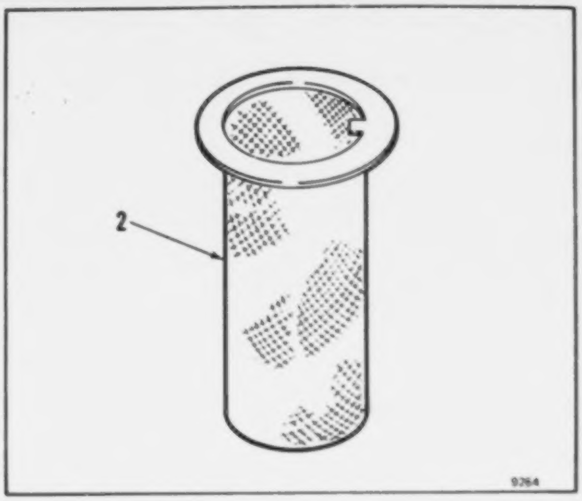
## 6-71.1 CLEAN AND INSPECT COMBINING TRANSMISSION OIL FILLER SCREEN (Continued) 6-71.1

3. **Check screen (2)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

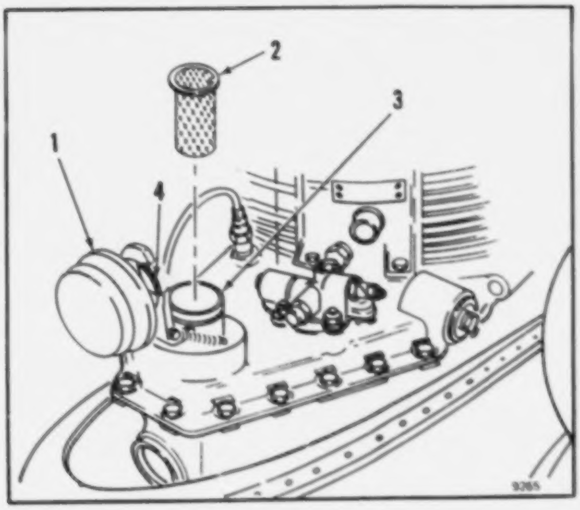
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. **Inspect screen (2)** for tears. There shall be no tears.



6. Open cap assembly (1). **Install screen (2)** in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.

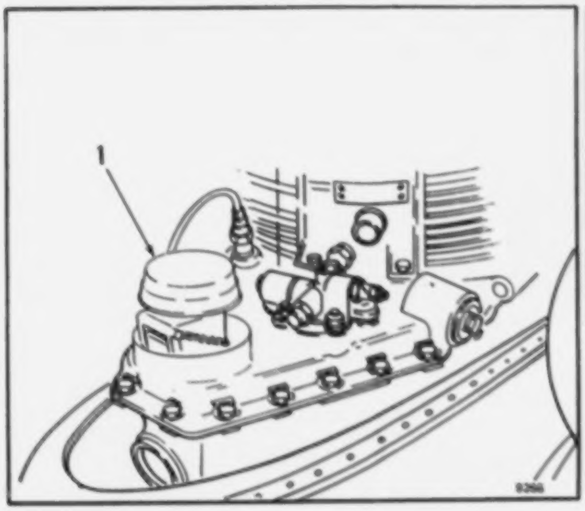


8. Close cap assembly (1).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close aft pylon doors (Task 2-2).



**END OF TASK**

## 6-71.2 REMOVE COMBINING TRANSMISSION OIL FILLER ASSEMBLY

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***

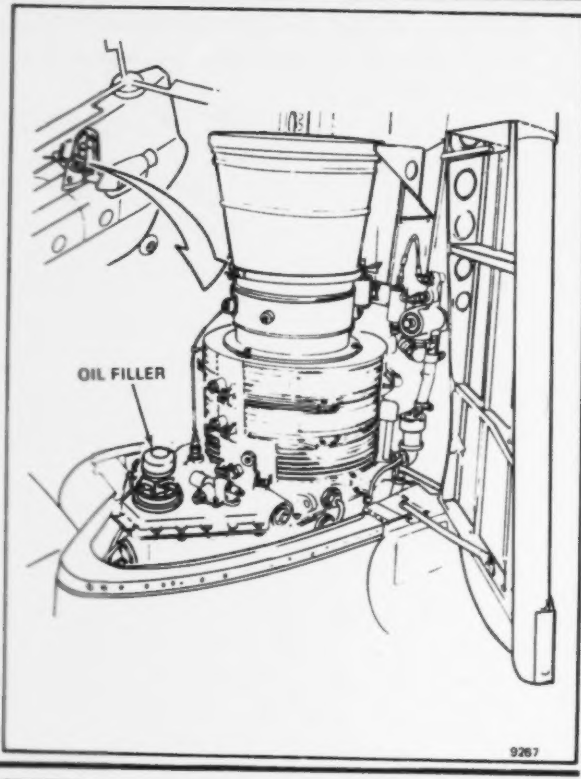
Barrier Material (E80)
Masking Tape (E388)

***Personnel Required:***

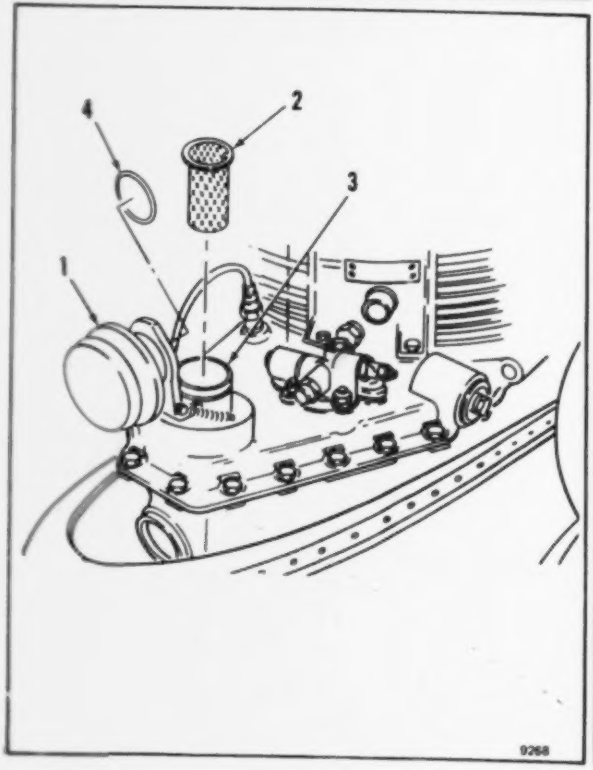
Medium Helicopter Repairer

***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)



1. Open cap assembly (1). **Remove screen (2)** from neck (3). **Remove packing (4)** from underside of cap assembly.



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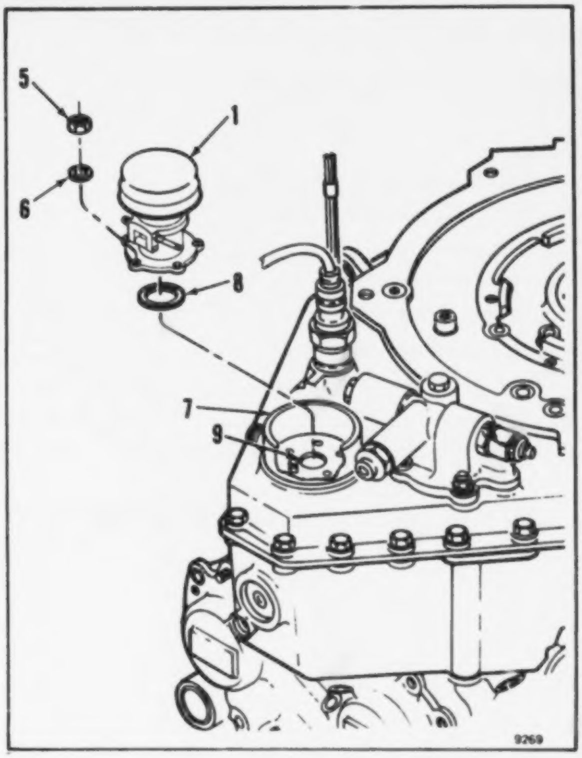
## 6-71.2 REMOVE COMBINING TRANSMISSION OIL FILLER ASSEMBLY (Continued) 6-71.2

2. Remove five nuts (5) and washers (6) from inside scupper (7). **Remove cap assembly (1)** and packing (8).
3. **Cover cavity (9)** with barrier material (E80) and masking tape (E388).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-71.3 INSTALL COMBINING TRANSMISSION OIL FILLER ASSEMBLY 6-71.3

INITIAL SETUP

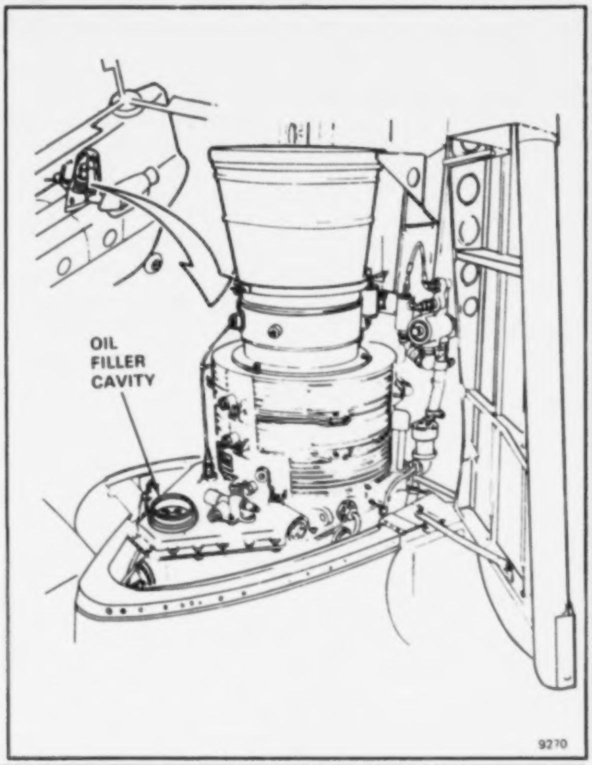
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

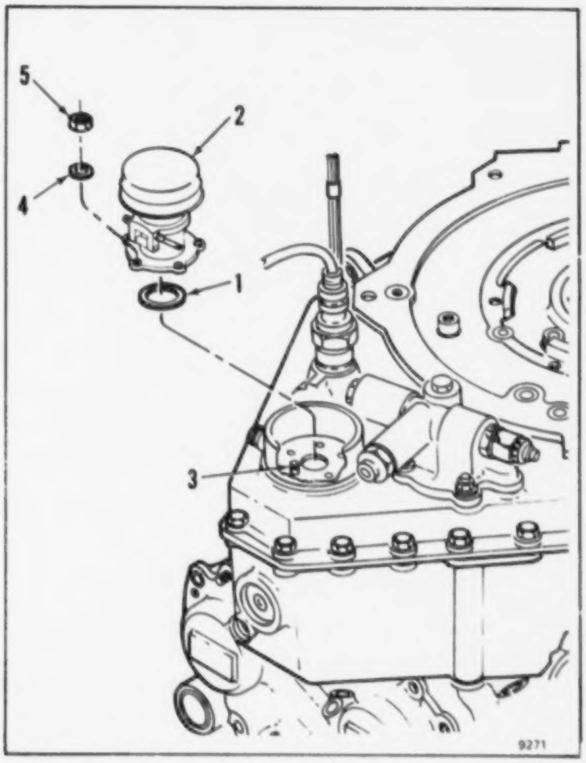
***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P



1. **Install packing (1)** on bottom of cap assembly (2). **Install cap assembly,** with packing, on studs (3).
2. **Install** five washers (4) and **nuts (5). Torque nuts to 60 inch-pounds.**



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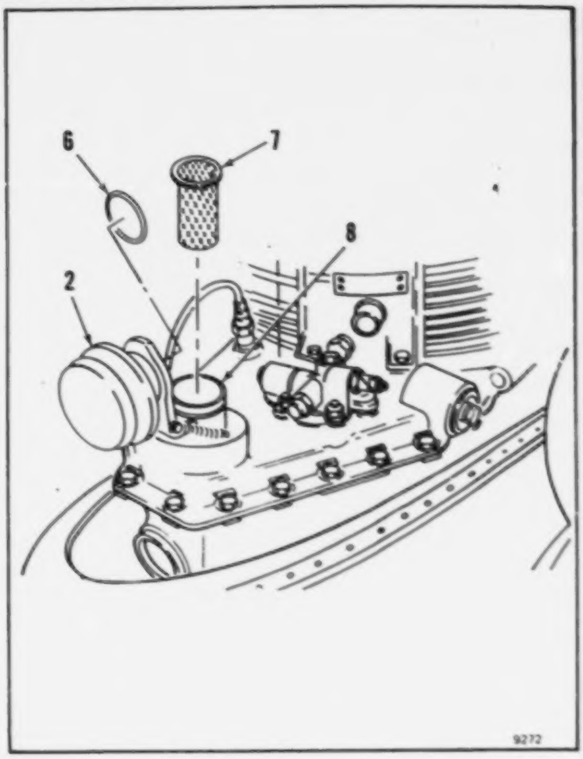
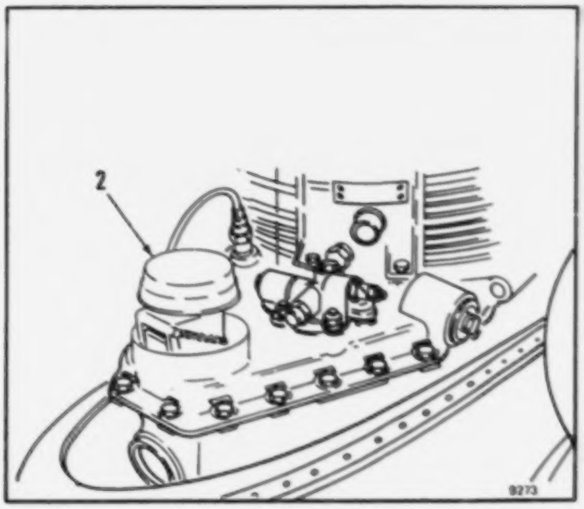
## 6-71.3 INSTALL COMBINING TRANSMISSION OIL FILLER ASSEMBLY (Continued) 6-71.3

3. Open cap assembly (2). **Install packing (6)** on bottom of cap.
4. **Install screen (7)** in neck (8).



5. Close cap assembly (2).

***INSPECT***



FOLLOW-ON MAINTENANCE:

Close aft pylon doors (Task 2-2).

**END OF TASK**

## 6-72 REMOVE COMBINING TRANSMISSION 6-72

INITIAL SETUP

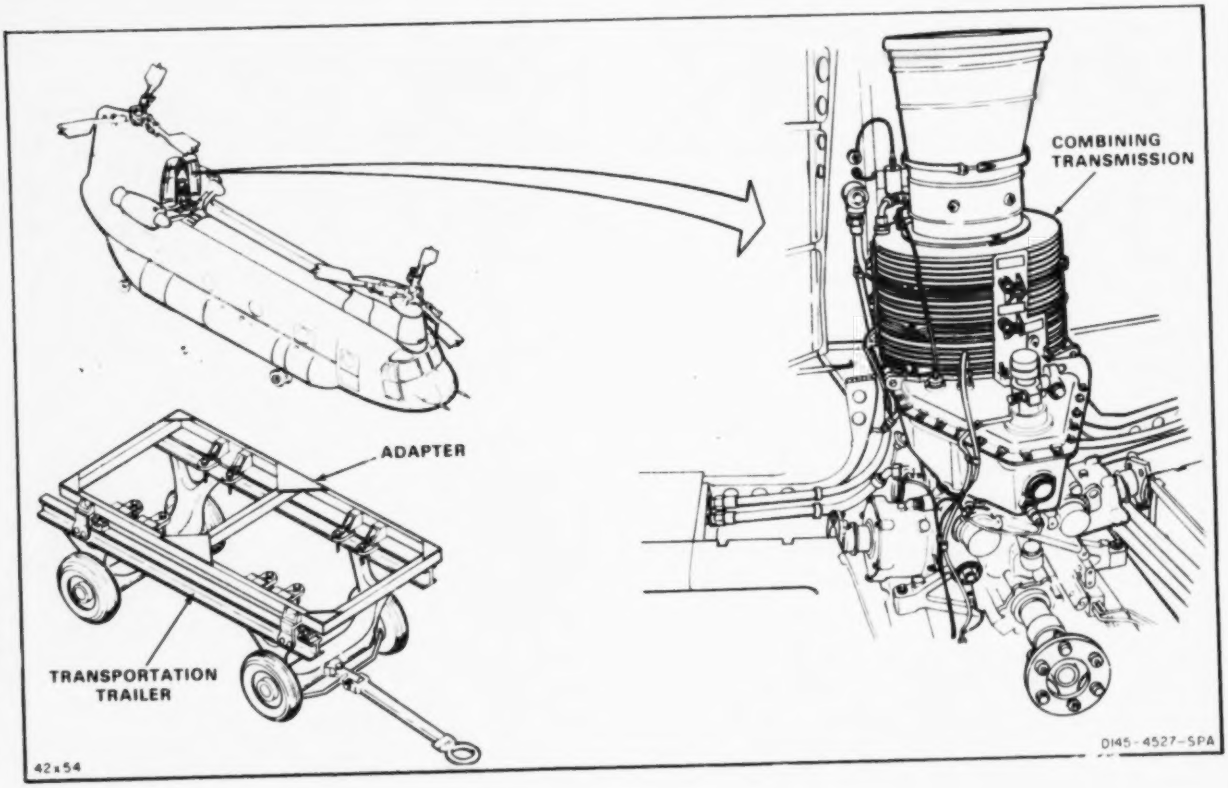
***Applicable Configurations:***
All

***Tools:***
- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Container, Two Quart
- Open End Wrench, 1 1/2-Inch
- Open End Wrench, 1 1/8-Inch
- Work Hoist, 2000 Pound Capacity
- Sling (T34)
- Rope Guide Line (2)

***Materials:***
- Paper Tags (E264)

***Personnel Required:***
- 67U10 Medium Helicopter Repairer
- 67U20 Medium Helicopter Repairer

***Equipment Condition:***
- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Hydraulic Power Off
- Aft Pylon Door Open (Task 2-2)
- Aft Pylon Lower Fairing Removed (Task 2-2)
- Left and Right Transmission Shafts and Combining Transmission Adapter Assembly Removed (Task 6-30)
- No. 7 Forward Drive Shaft Removed (Task 6-4)
- Adapter (T20) Installed on Transportation Trailer 2000 (Task 2-140)



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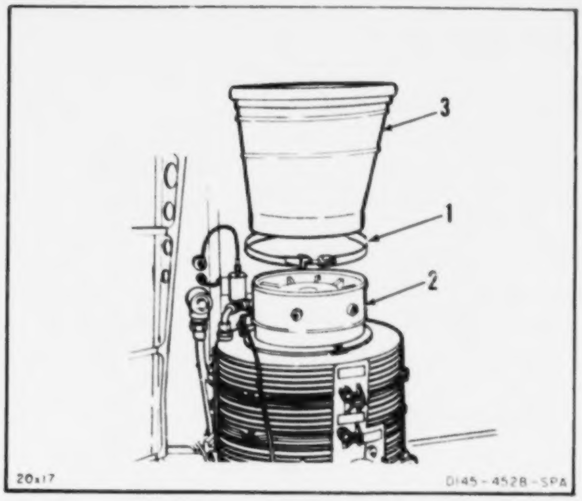
## 6-72 REMOVE COMBINING TRANSMISSION (Continued) 6-72

1. Loosen clamp (1) around fan (2) and duct (3). **Remove duct.**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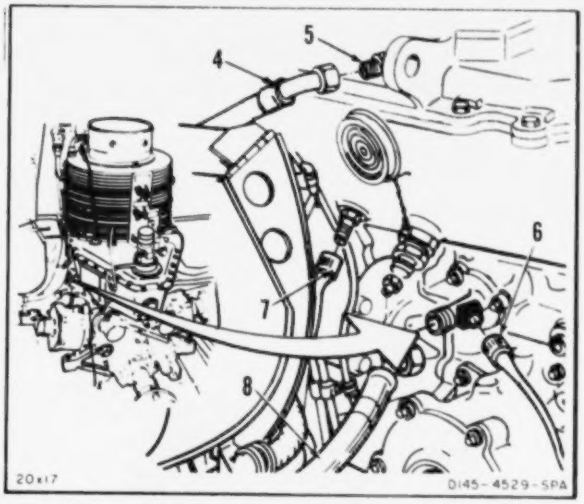
2. Remove breather hose (4) from reducer (5).
3. Tag and **disconnect connector (6).** Tag and **disconnect connector (7).**
4. **Disconnect oil hose (8).** Cap hose quickly to prevent oil loss. Use container to catch spilled oil.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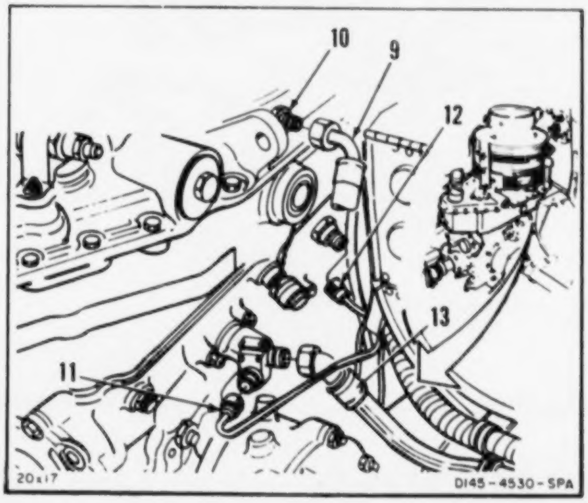
D145-4529-SPA

5. Remove breather hose (9) from reducer (10).
6. Tag and **disconnect connector (11).** Tag and **disconnect connector (12).**
7. **Disconnect oil hose (13).** Cap hose quickly to prevent oil loss. Use container to catch spilled oil.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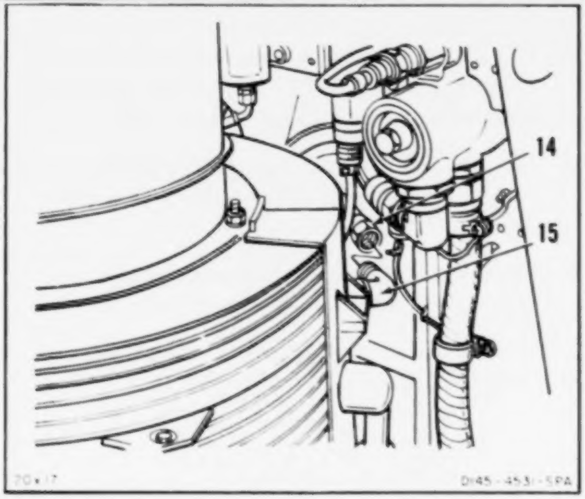
## 6-72 REMOVE COMBINING TRANSMISSION (Continued) 6-72

8. Tag and **disconnect oil hose (14)** from elbow (15).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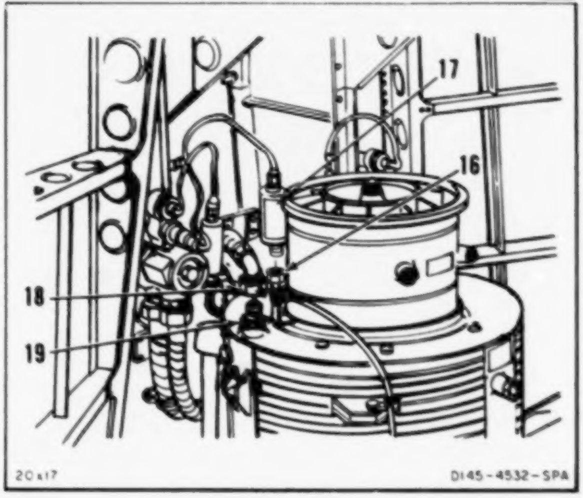
D145-4531-SPA

9. **Disconnect oil hose (16)** from transducer (17).
10. Tag and **disconnect oil hose (18)** from reducer (19).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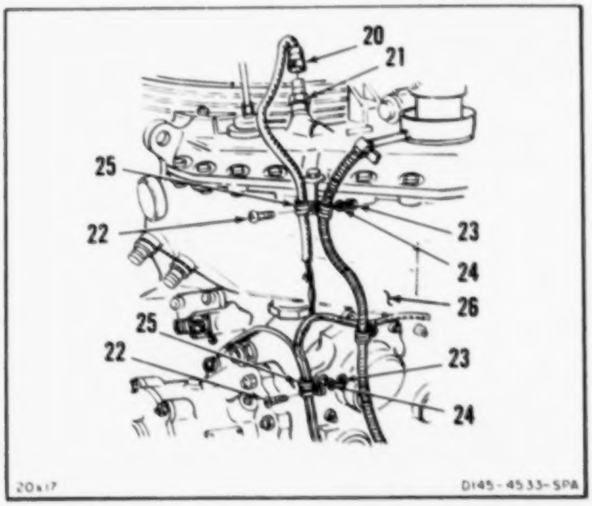
11. Tag and **disconnect connector (20)** from COMB PRESS SWITCH — MAIN receptacle (21).
12. **Remove two screws (22),** nuts (23), and washers (24) from clamps (25). **Disconnect clamps from transmission (26).**
13. Loosely install screws (22), washers (24), and nuts (23) on two clamps (25).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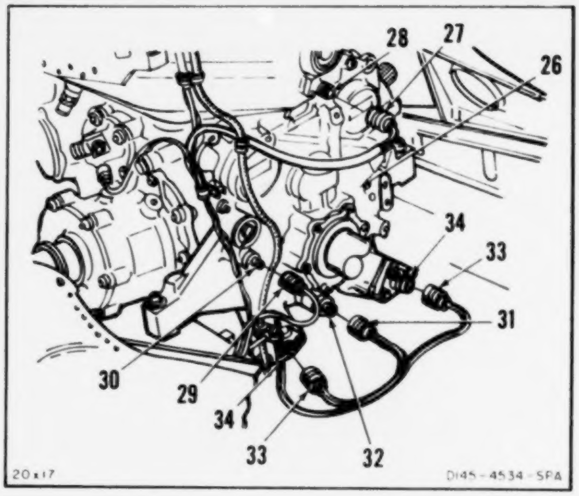
## 6-72 REMOVE COMBINING TRANSMISSION (Continued) 6-72

14. Tag and **disconnect connector (27) from COMB XMSN TEMP BULB receptacle (28) at front of transmission (26).**

15. Tag and **disconnect connector (29)** from COMB PRESS SWITCH — AUX receptacle (30).

16. Tag and **disconnect connector (31)** from COM CHIP DETECTOR receptacle (32).

17. Tag and **disconnect connectors (33)** from COMB DEBRIS SCREEN receptacles (34).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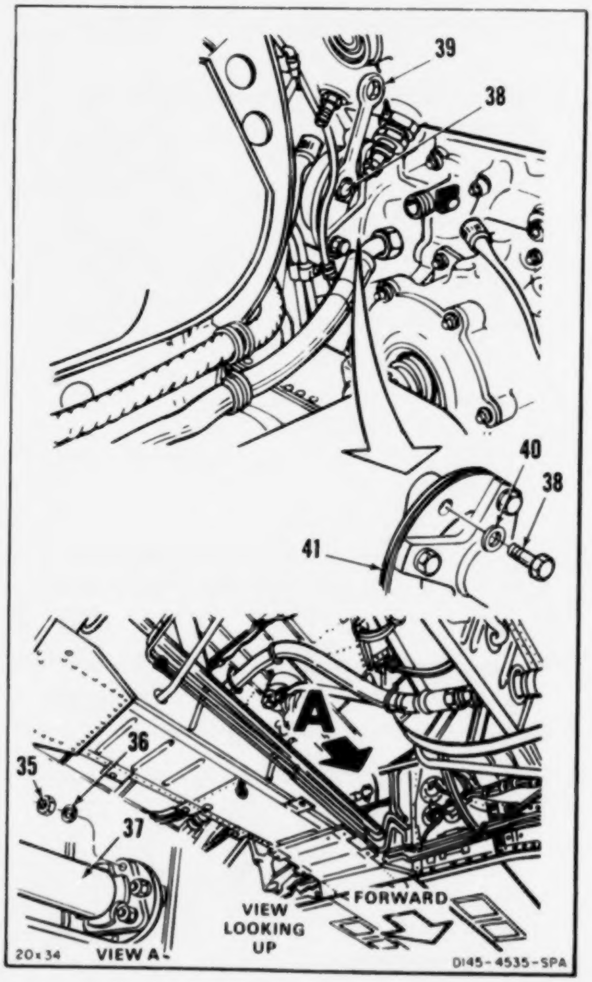
D145-4534-SPA

**CAUTION**

**If bolt turns, it can damage adapter assembly.**

18. Hold bolts (38) with wrench (39) to keep bolts from turning. Remove three nuts (35) and washers (36) from aft drive shaft (37) inside helicopter.

19. **Remove three bolts (38)** and special washers (40) from adapter assembly (41).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D145-4535-SPA

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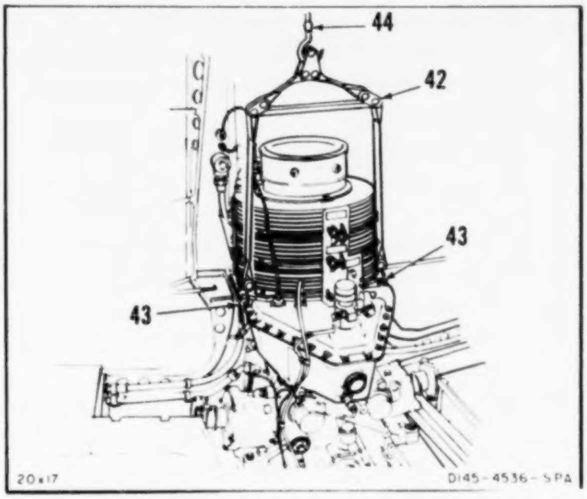
## 6-72 REMOVE COMBINING TRANSMISSION (Continued) 6-72

20. **Connect sling (T34) (42)** to two hoisting eyes (43). **Connect hoist hook (44)** to sling.
21. Raise hoist hook (44) to remove slack from sling (T34) (42). Do not put tension on sling.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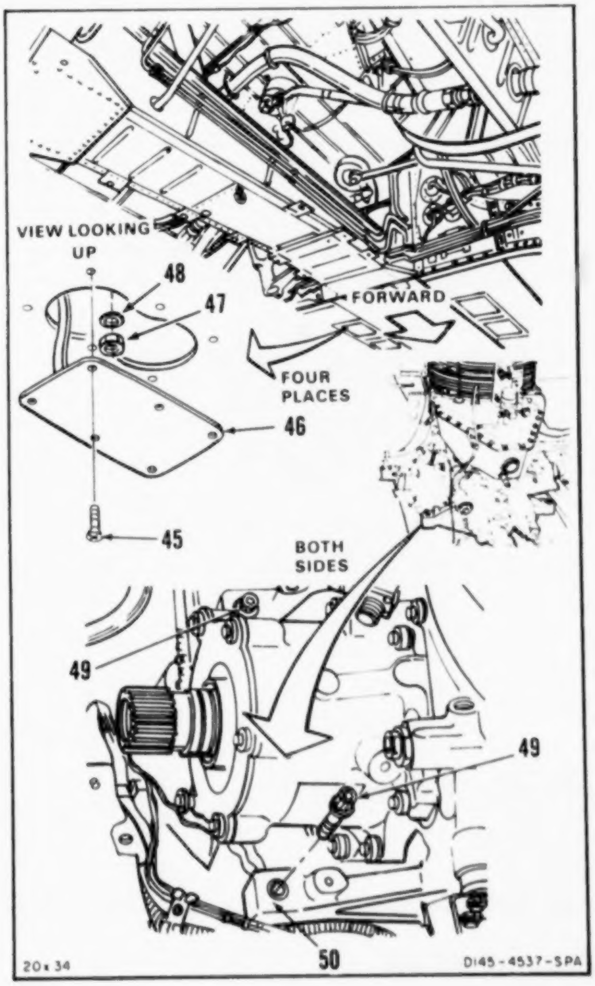
D145-4536-SPA

22. Remove 24 screws (45) and four access panels (46) from cabin ceiling.
23. Remove four mounting nuts (47) and washers (48).
24. **Remove four bolts (49)** from mounting lugs (50).


VIEW LOOKING UP
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FORWARD
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D145-4537-SPA

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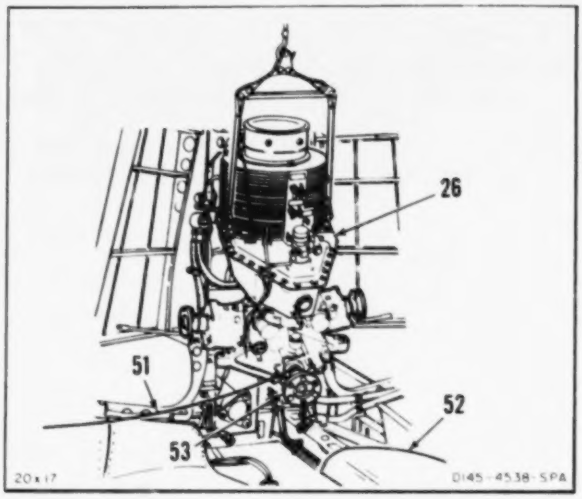
## 6-72 REMOVE COMBINING TRANSMISSION (Continued) 6-72

25. **Slowly raise transmission (26) 1 inch. Check that all wires and hoses between transmission and helicopter have been disconnected.**
26. Attach rope guide line (51) to each side of transmission (26).

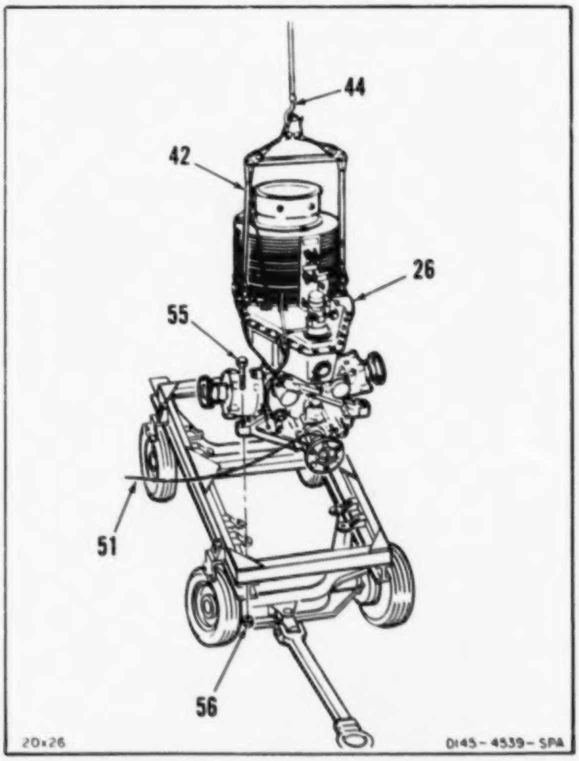
WAR . WARNING

**Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.**

27. With aid of helper. **raise transmission (26) up and away from helicopter.** Turn transmission as needed for clearance. Raise and lower access door (52) as needed to clear adapter assembly (53).



28. **Lower transmission (26) onto adapter (T20) (54).** Install four bolts (55) and nuts (56).
29. Remove hoist cable (44) and sling (42). Remove guide lines (51).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-73 DISASSEMBLE COMBINING TRANSMISSION 6-73

INITIAL SETUP

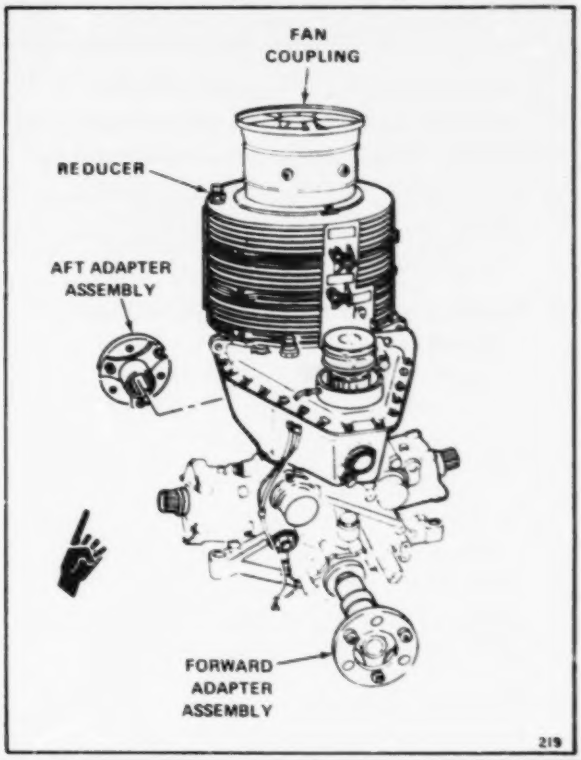
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wood Dowel, 1-Inch x 18-Inches

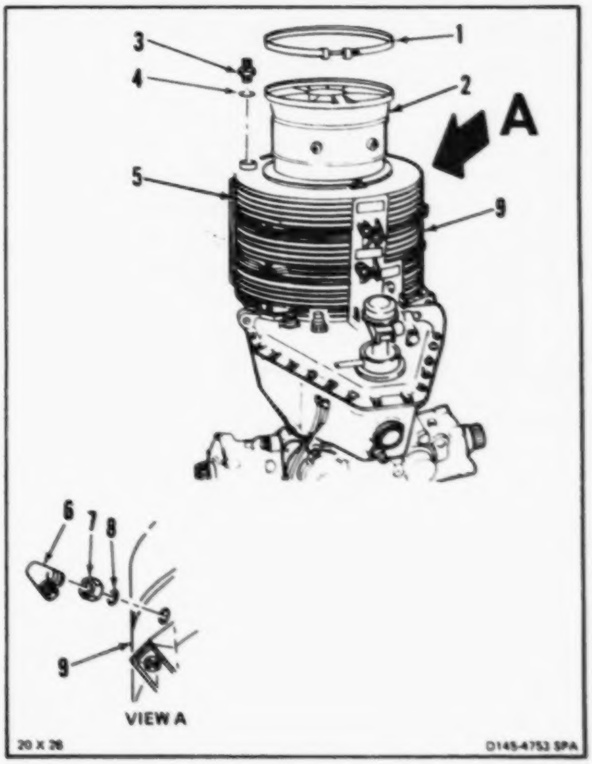
***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer (2)

***Equipment Condition:***
Off Helicopter Task


FAN COUPLING
REDUCER
AFT ADAPTER ASSEMBLY
FORWARD ADAPTER ASSEMBLY
219

1. **Remove coupling (1)** from around top of fan (2).
2. **Remove reducer (3)** and packing (4) from oil cooler (5).
3. **Remove elbow (6)**, nut (7), and packing (8) from oil cooler (9).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D145-4753 SPA

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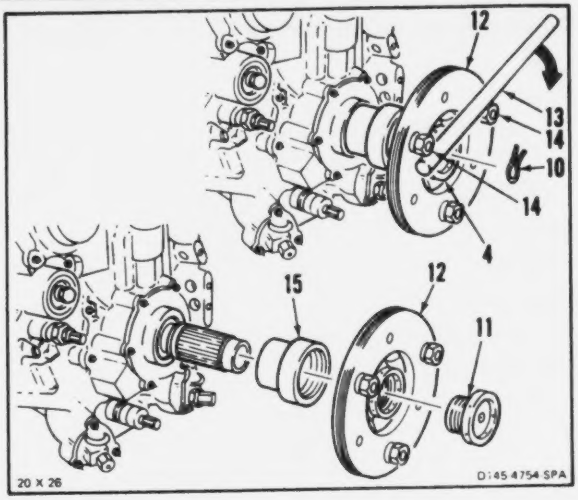
## 6-73 DISASSEMBLE COMBINING TRANSMISSION (Continued) 6-73

4. **Remove lockring (10)** from retainer (11) at forward output shaft adapter assembly (12).
5. Place wood dowel (13) across nuts (14) as shown. Hold dowel to keep adapter assembly (12) from turning. **Remove retainer (11).**
6. **Remove adapter assembly (12) and retainer (15).**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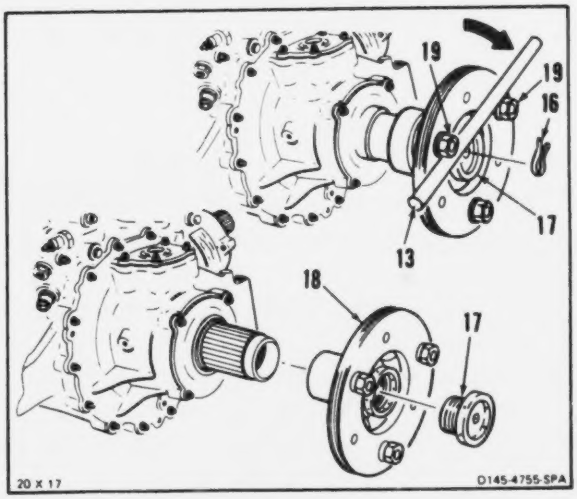
D145 4754 SPA

7. **Remove lockring (16)** from retainer (17) at aft output shaft adapter assembly (18).
8. Place wood dowel (13) across nuts (19) as shown. Hold dowel to keep adapter assembly (18) from turning. **Remove retainer (17).**
9. Remove adapter assembly (18).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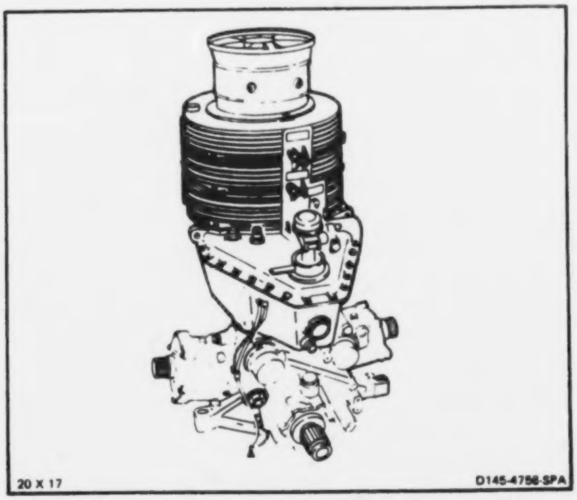
D145-4755-SPA

FOLLOW-ON MAINTENANCE:

None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D145-4756-SPA

**END OF TASK**

## 6-73.1 REPAIR COMBINING TRANSMISSION OUTSIDE SURFACE 6-73.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Dial Indicating Depth Gage 643J
Goggles

***Materials:***

Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Black Lacquer Topcoat (E462)

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 43-0103
MIL-M-3171, Type VI
MIL-C-22751

***Equipment Condition:***

Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cuase burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

*GO TO NEXT PAGE*

## 6-73.1 REPAIR COMBINING TRANSMISSION OUTSIDE SURFACE (Continued) 6-73.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on housing (1) and sump cover (2).

**NOTE**

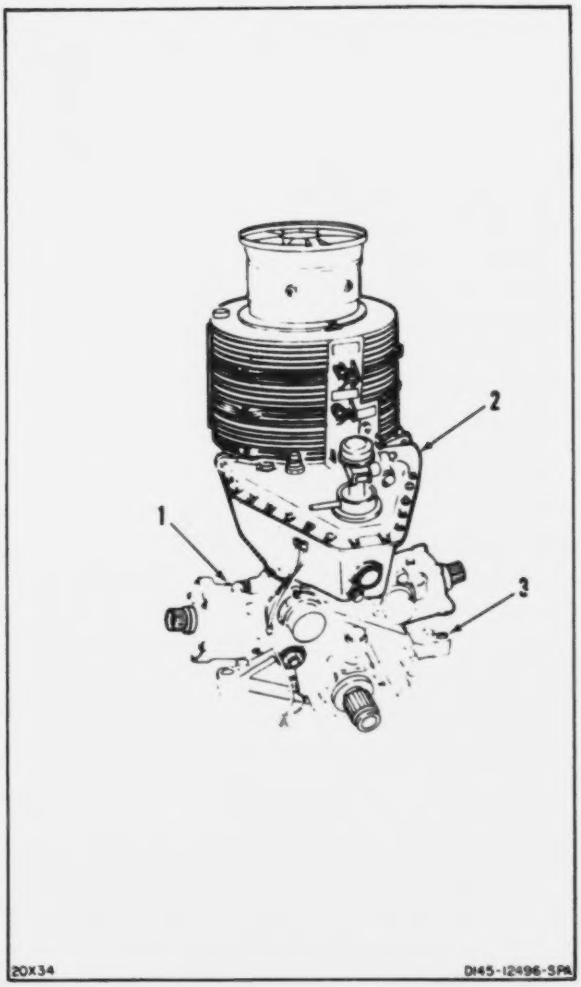
Refer to Task 6-35 for repairs to sump.

**NOTE**

Limits in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**
   b. **Damage shall not extend over more than one surface or enter any radius.**
   c. **Damage shall not be closer than 1.00 inch to any mounting hole (3).**

3. **Fluorescent inspect** damaged area to check for cracks. (Refer to TM 43-0103.) **There shall be no cracks.**
4. Cover moving parts near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.



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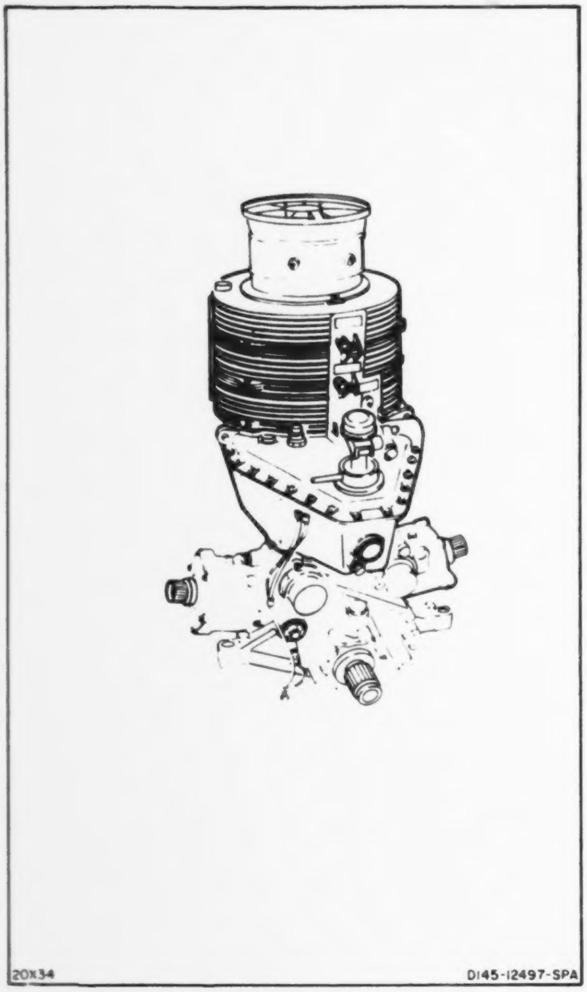
## 6-73.1 REPAIR COMBINING TRANSMISSION OUTSIDE SURFACE (Continued) 6-73.1

6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid etch reworked area** as follows:
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.
   b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths. Wear gloves (E186). Let area air dry.
   b. **Swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, Type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry. Wear gloves (E186).
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours. Wear gloves (E186).
11. **Apply black lacquer topcoat (E462)** (MIL-C-22751). Wear gloves (E186).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

***GO TO NEXT PAGE***

## 6-74 PREPARE COMBINING TRANSMISSION FOR SHIPMENT OR STORAGE 6-74

INITIAL SETUP

***Applicable Configurations:***
All

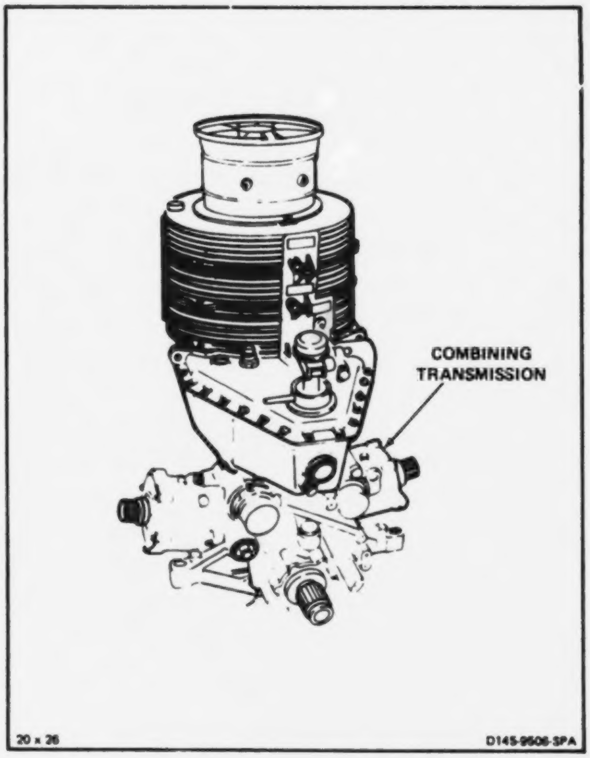
***Tools:***
- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Sling (T34)
- Work Hoist
- Shipping Container (T36)
- Container, 14-Quart (3)
- Torque Wrench, 0 to 500 Foot-Pounds
- Hose, 3/4-Inch ID, 24 Inches Long

***Materials:***
- Fingerprint Remover (E175)
- Cloths (E120)
- Dry Cleaning Solvent (E162)
- Gloves (E186)
- Swabbing Brush (E86)
- Corrosion Preventive Compound (E153 or E154)
- Barrier Material (E81)
- Masking Tape (E388)
- Dessicant (E160), 16-Unit Bag (2)

***Personnel Required:***
- Medium Helicopter Repairer (2)
- Inspector

***References:***
- TB 55-8100-200-25
- TM 38-750
- TB 750-126

***Equipment Condition:***
- Off Helicopter Task
- Combining Transmission Disassembled (Task 6-73)



***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

***GO TO NEXT PAGE***

## 6-74 PREPARE COMBINING TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-74

1. **Drain oil** from each of three compartments of sump (1) as follows:

   **NOTE**

   Sump holds a total of about 33 quarts of oil.

   a. Install hose on drain valve (2 or 3). Push in drain valve, twist it, and pull. Let oil drain into containers.

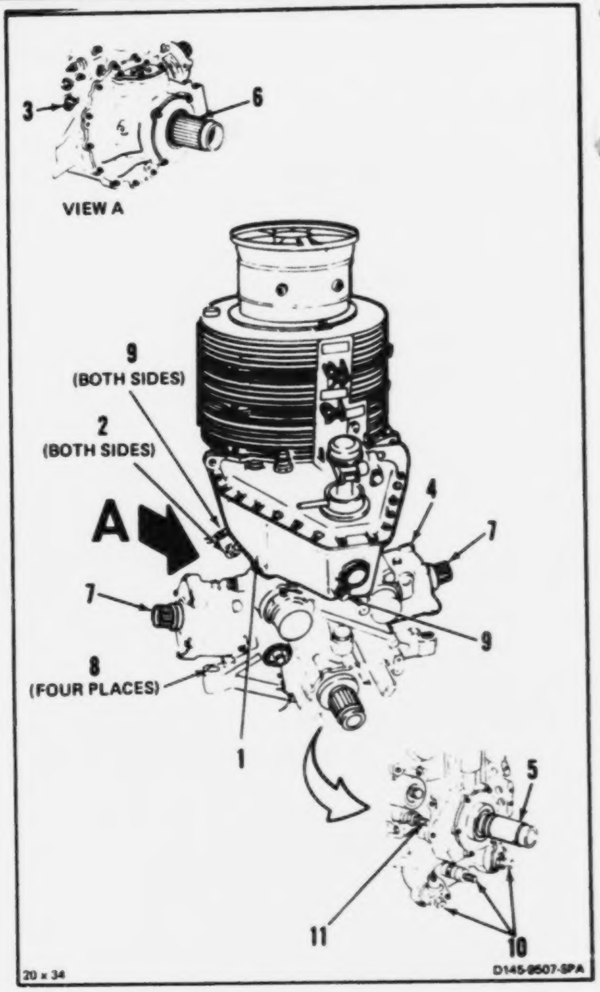
   b. Push in valve (2 or 3), twist it, and pull to close. Remove hose.

2. Put on gloves (E186). Gloves shall be worn for the rest of this task.
3. Clean all surfaces of transmission (4). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
4. **Clean** forward output shaft **splines (5),** aft output shaft **splines (6),** input shaft **splines (7), and four bushings (8).** Use fingerprint remover (E150) and clean cloths (E104).

   **CAUTION**

   **Touching unpainted surfaces with bare fingers can cause corrosion.**

5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. **Coat splines (5, 6, and 7) and four bushings (8)** with corrosion-preventive compound (E153 or E154). Use swabbing brush (E67).
7. Cover splines (5, 6, and 7) and bushings (8) with barrier material (E81) and tape (E388).
8. **Cover three drain valves (2 and 3), three temperature probes (9), and electrical connectors (10 and 11)** with barrier material (E81) and tape (E388).



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## 6-74 PREPARE COMBINING TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-74

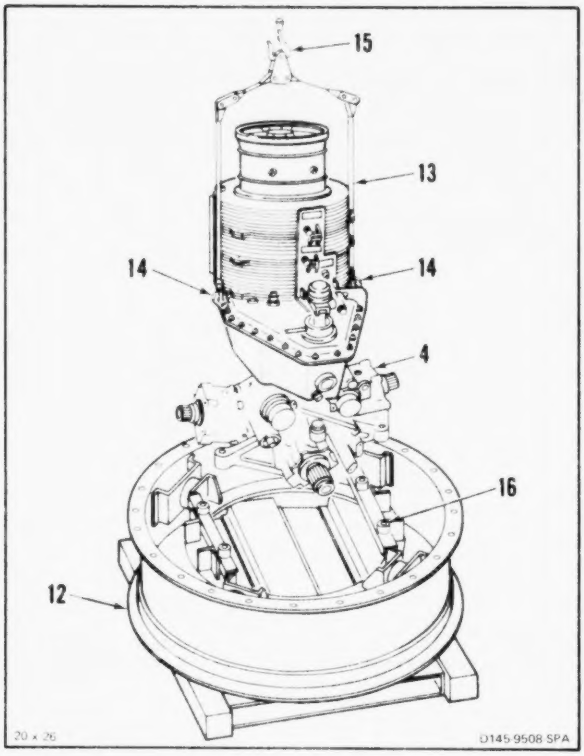
9. Install transmission (4) in shipping container (T36) (12) as follows:

   a. Inspect and prepare container (T36) (12) (TB 55-8100-200-25).

   b. Connect sling (T34) (13) to two lifting lugs (14). Connect work hoist hook (15) to sling.

   c. With aid of helper, **lift transmission (4) into container (T36) (12). Align with four mounting brackets (16).**

   d. Remove sling (T34) (13).



   e. **Secure transmission (4)** to container mounting brackets (16) **with four bolts (17), washers (18), and nuts (19). Torque nuts to 55 foot-pounds.**

   f. Prepare required maintenance forms and reports (TM 38-750 and TB 750-126).

   g. Put two 16-unit bags of desiccant (E160) into containers (T36) (12).

***INSPECT***

   h. Install cover (20) on container (T36) (12). Install bolts (21), washers (22), split washer (23), and nut (24) at 24 places.

   i. **Torque nuts (24) at 3, 6, 9, and 12 o'clock to 275 inch-pounds. Torque nuts at 2, 4, 8, and 12 o'clock to 275 inch-pounds. Torque remaining nuts to 275 inch-pounds.**

***INSPECT***

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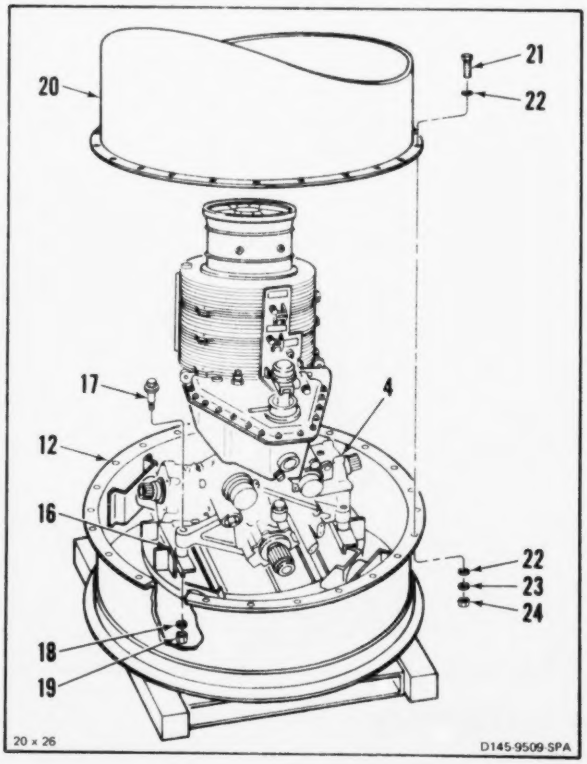
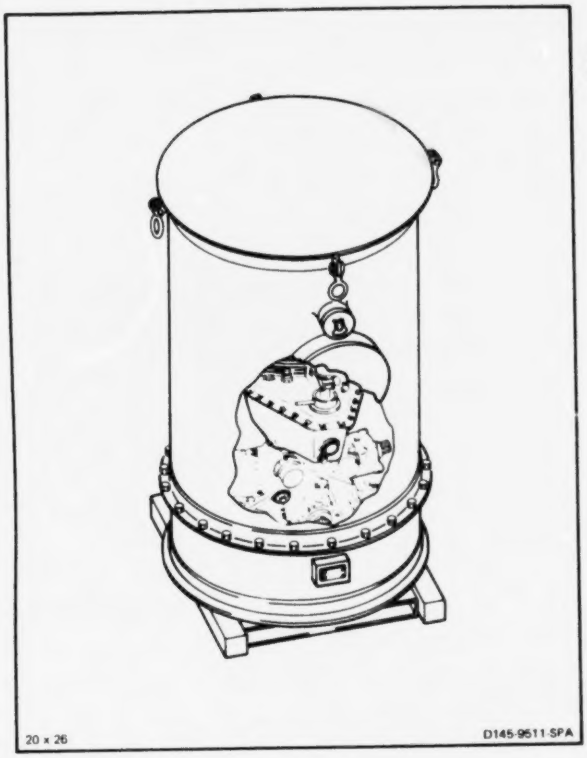


## 6-74 PREPARE COMBINING TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-74

FOLLOW-ON MAINTENANCE:
None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**END OF TASK**

## 6-75 REMOVE COMBINING TRANSMISSION FROM STORAGE 6-75

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Sling (T34)
Work Hoist
Container, Two Quart
Workstand (T20)

***Materials:***

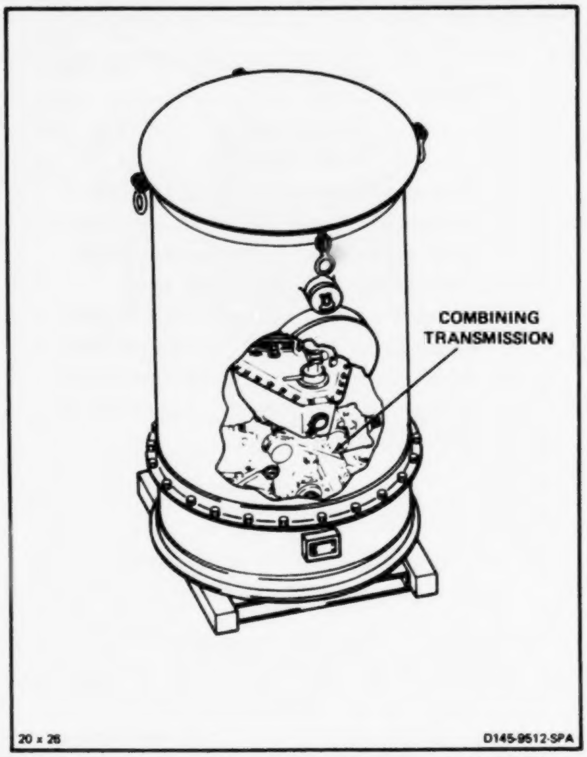
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

***Personnel Required:***

Medium Helicopter Repairer (2)
Inspector

***Equipment Condition:***

Off Helicopter Task



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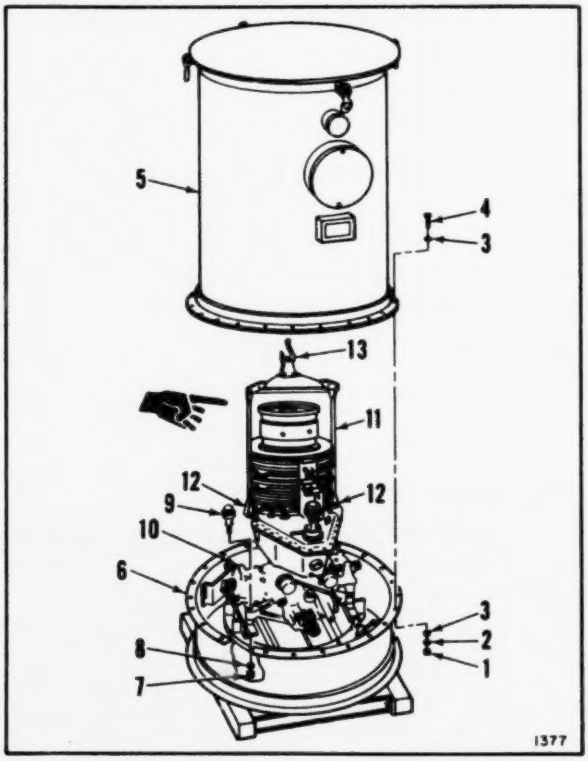
1. Remove 24 nuts (1), washers (2 and 3), and bolts (4) from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. Remove four nuts (7), washers (8), and bolts (9) from transmission (10).
4. **Connect sling (T34) (11)** to two lugs (12). **Connect work hoist (13)** to sling.
5. With aid of helper, carefully **lift transmission (10)** from container (6).
6. Set transmission (10) down on workstand (T20). Remove sling (T34) (11).
7. Install four bolts (9), washers (8), and nuts (7) in container (6).
8. Install cover (5). Install 24 bolts (4), washers (3), split washers (2) and nuts (1).



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## 6-75 REMOVE COMBINING TRANSMISSION FROM STORAGE (Continued) 6-75

9. Remove all tape and barrier material from transmission (10).

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

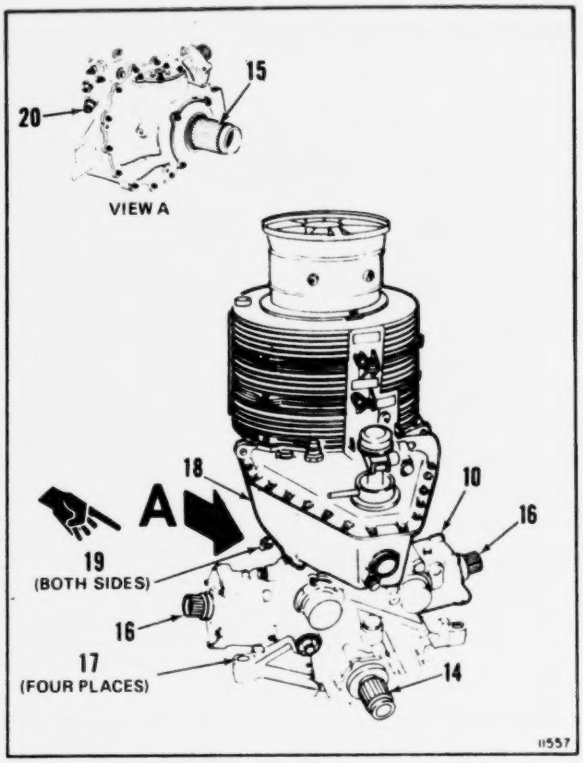
**Touching splines with bare fingers can cause corrosion.**

10. **Remove corrosion preventive compound from** forward output shaft **splines (14),** aft output shaft **splines (15),** input shaft **splines (16) and four bushings (17).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles and gloves (E186).

11. **Drain residual oil** from each of three compartments of sump (18) as follows:

    a. Install hose on drain valve (19 or 20). Push in drain valve, twist it, and pull. Let oil drain into container.

    b. Push in valve (19 or 20), twist it, and pull to close.



***INSPECT***

FOLLOW-ON MAINTENANCE:

Assemble combining transmission (Task 6-76).

**END OF TASK**

## 6-76 ASSEMBLE COMBINING TRANSMISSION 6-76

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 700 to 1600 Inch-Pounds
Wood Dowel, 1-Inch x 18 Inches

***Materials:***

Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Gloves (E186)

***Parts:***

Packings

***Personnel Required:***

Medium Helicopter Repairer (2)
Inspector

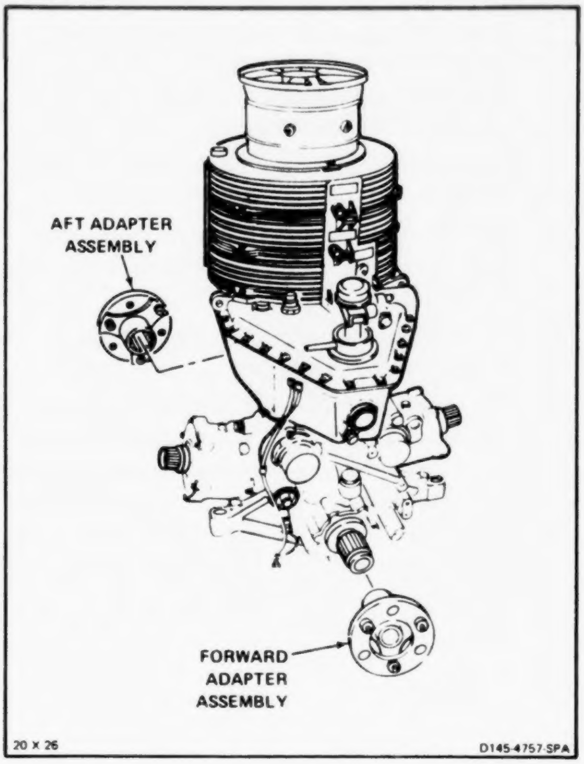
***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



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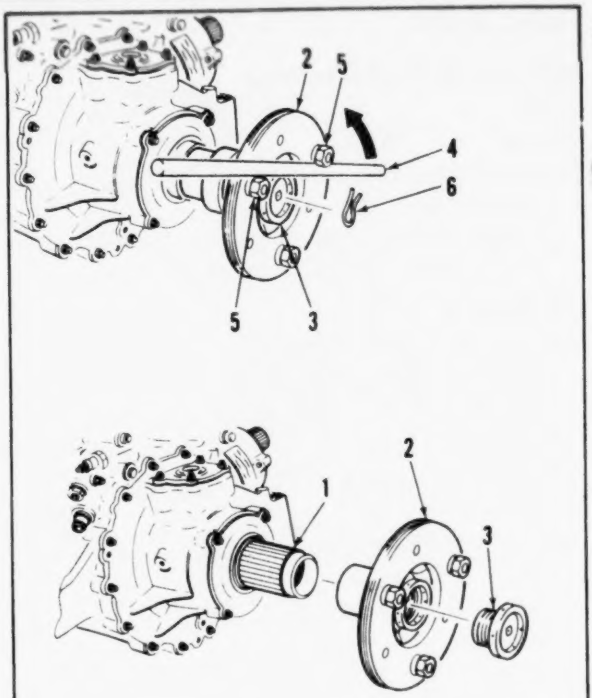
## 6-76 ASSEMBLE COMBINING TRANSMISSION (Continued) 6-76

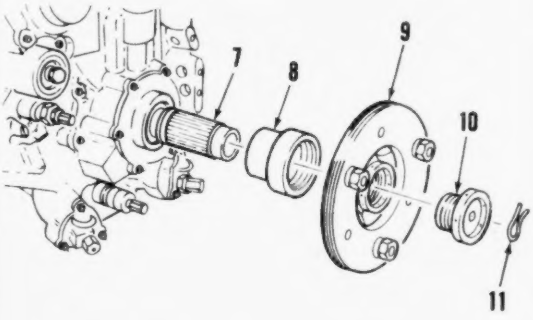
1. Clean splines on aft output shaft (1) and adapter assembly (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
2. Pack splines on output shaft (1) and adapter assembly (2) with grease (E190).
3. **Install adapter assembly (2)** on output shaft (1). Wipe off excess grease with cloths (E120).
4. Coat thread of retainer (3) with grease (E190). **Install retainer.**
5. Place wood dowel (4) across nuts (5) as shown. Hold dowel to keep adapter assembly (2) from turning. **Torque retainer (3) to 825 inch-pounds.** Continue tightening to align holes in retainer and adapter assembly.
6. **Install lockring (6).** Check that lockring protrudes through adapter assembly (2) at least 0.060 inch.



7. Clean splines on forward output shaft (7), retainer (8), and adapter assembly (9). Use solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
8. Pack splines on shaft (7), retainer (8), and adapter assembly (9) with grease (E190).
9. **Install retainer (8) and adapter assembly (9)** on shaft (7). Wipe off excess grease with cloths (E120).
10. **Loosely install retainer (10)** to align holes in retainer and adapter assembly (9). **Install lockring (11).**

**NOTE**

Adapter assembly is adjusted and torqued during sync shaft installation.



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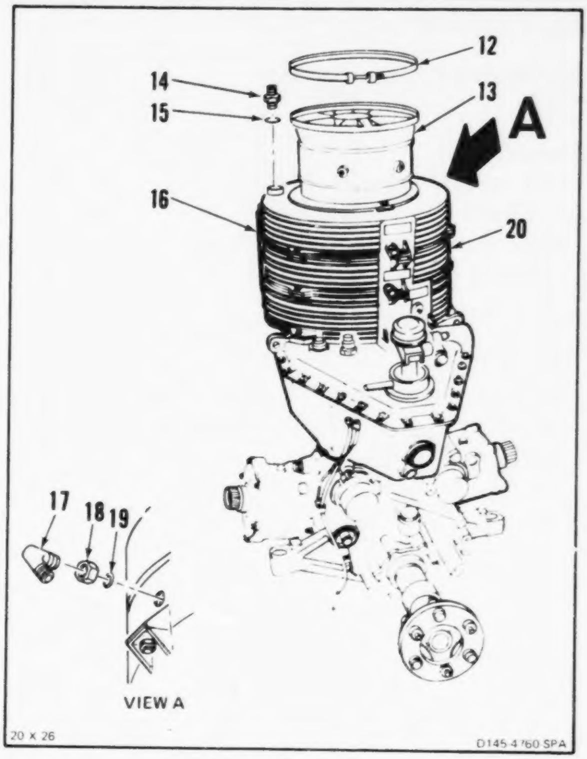
## 6-76 ASSEMBLE COMBINING TRANSMISSION (Continued) 6-76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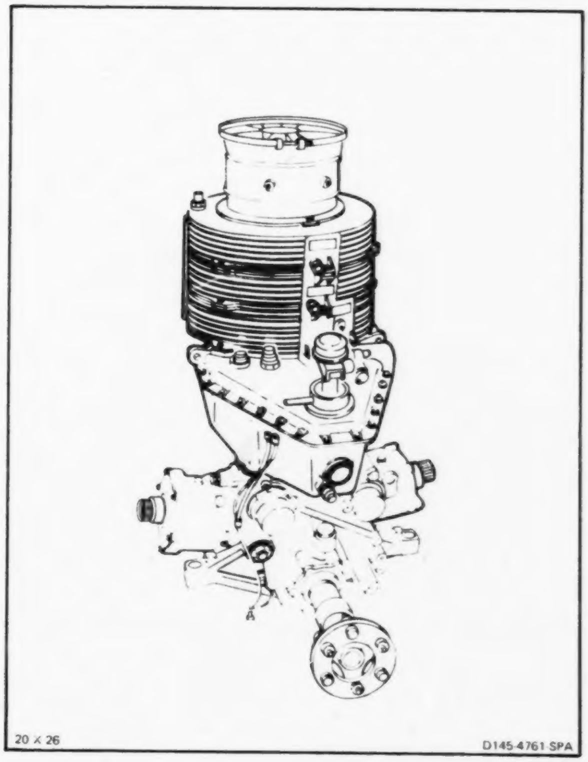
11. **Install coupling (12)** around top of fan (13).
12. **Install reducer (14)** and packing (15) in oil cooler (16).
13. **Install elbow (17),** nut (18), and packing (19) on oil cooler (20). Elbow shall point down and aft.

***INSPECT***

FOLLOW-ON MAINTENANCE:

None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**END OF TASK**

## 6-77 INSTALL COMBINING TRANSMISSION 6-77

INITIAL SETUP

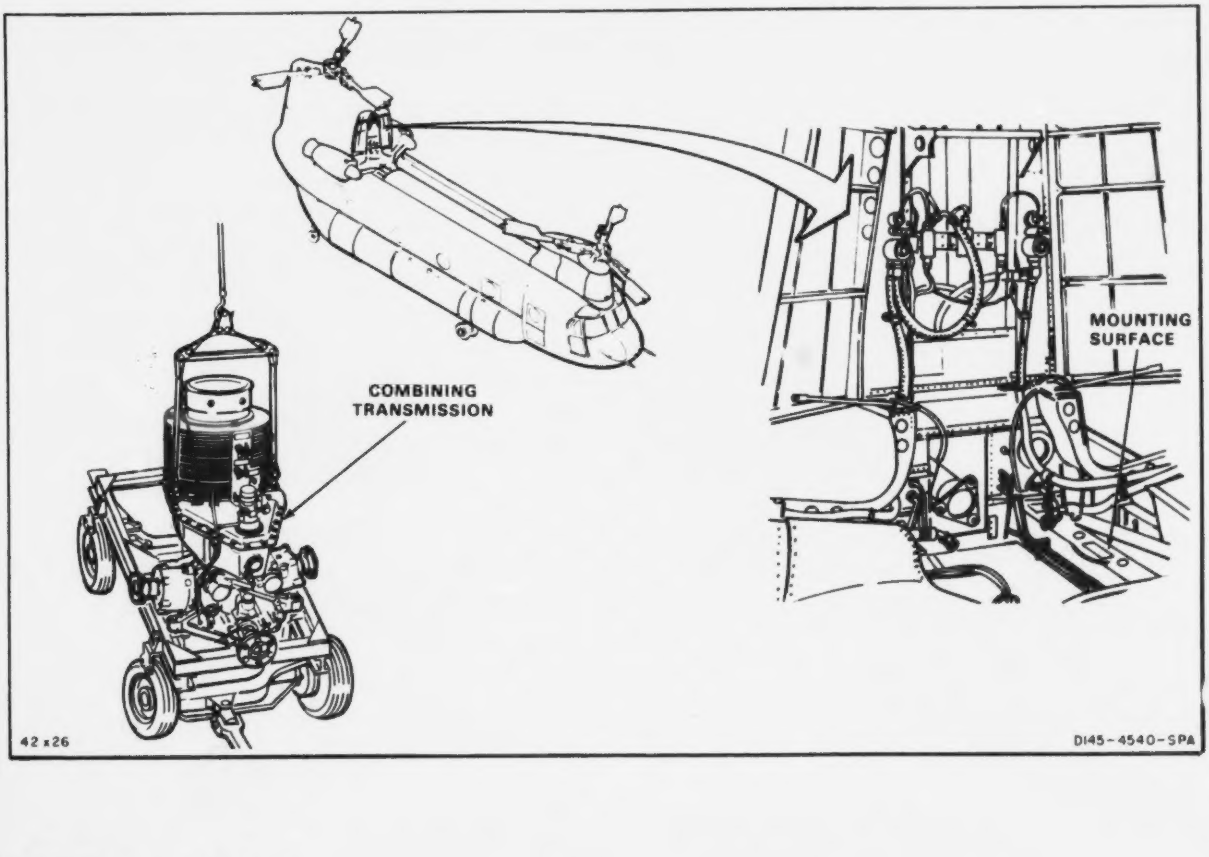
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 1/4-Inch
Container, Two Quart
Hoist, 2000 Pound Capacity
Sling (T34)
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds
Rope Guide Lines (2)

***Materials:***
Sealant (336)
Oil (254)
Cloths (E120)
Gloves (E186)

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P


COMBINING TRANSMISSION
MOUNTING SURFACE
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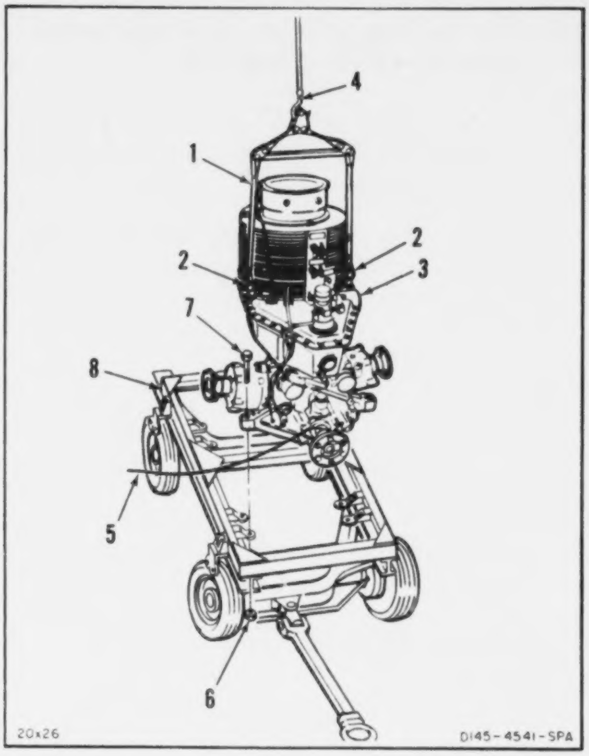
## 6-77 INSTALL COMBINING TRANSMISSION (Continued) 6-77

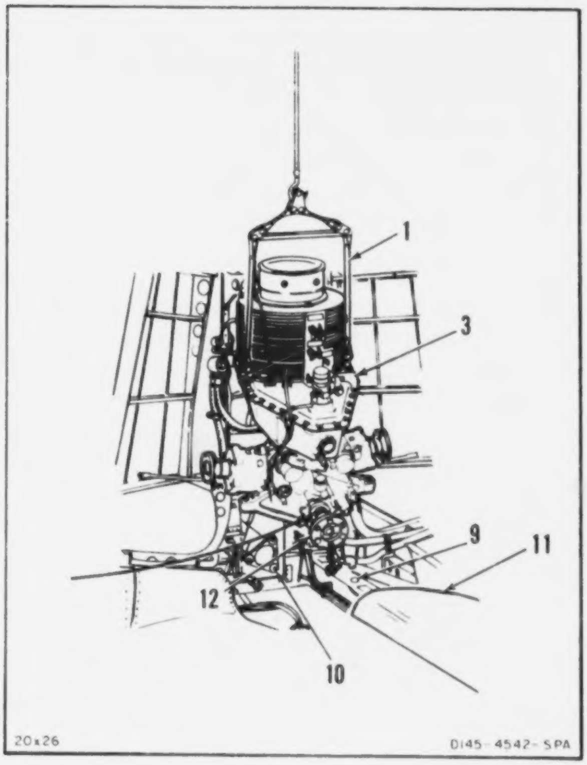
1. **Connect sling (T34) (1)** to two hoisting eyes (2) on transmission (3). **Connect hoist hook (4)** to sling (T34).
2. Attach rope guide line (5) to each side of transmission (3).
3. Remove four nuts (6) and bolts (7). **Raise transmission (3) from adapter (8).**



**WARNING**

**Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.**

4. Raise transmission (3) to helicopter. Align it with four mounting holes (9) and aft shaft (10).
5. With aid of helper, **lower transmission (3)** to four mounting holes (9). Raise and lower access door (11) as needed to clear adapter assembly (12). Keep tension on sling (T34) (1).



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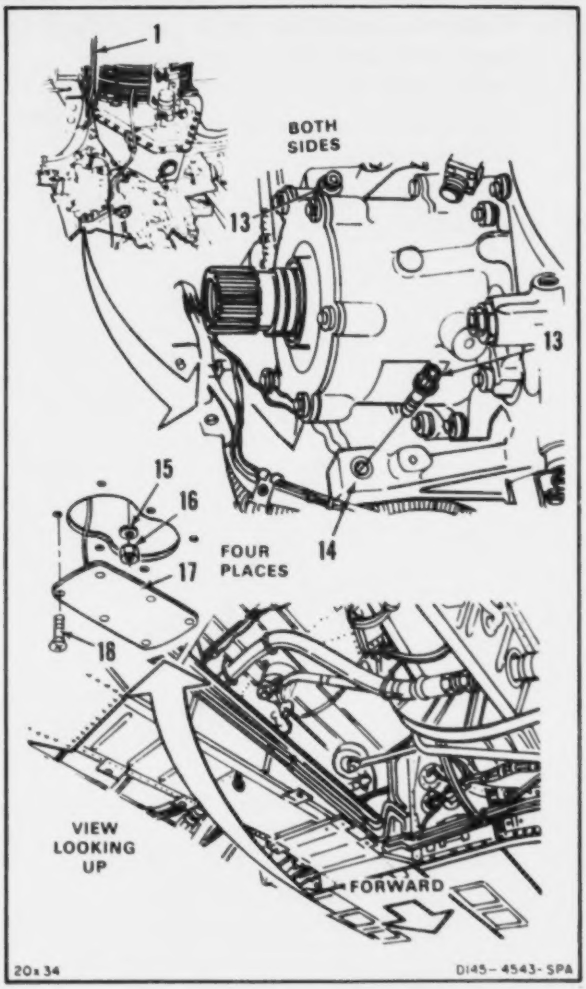
## 6-77 INSTALL COMBINING TRANSMISSION (Continued) 6-77



6. Coat four bolts (13) with oil (E254). **Install bolts in mounting lugs (14).**

**NOTE**

Refer to Task 1-13, para 8, for re-use of self-locking nuts.

7. **Install four washers (15) and nuts (16)** at cabin ceiling. When nuts are installed at least three turns, release tension from sling (T34) (1).

**CAUTION**

**Do not over torque nuts. Too much torque can damage nuts or bolts.**

8. **Torque four nuts (16) to 725 inch-pounds**. Check each bolt (13). Bolt shall extend 0.08 to 0.12 inch through nut. Use washers (15) of different thickness as needed.

***INSPECT***

**WARNING**

**Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

9. From inside, **install four access panels (17)** and 24 screws (18). Seal panels with sealant (E336). Wear gloves (E186) and goggles.

*GO TO NEXT PAGE*

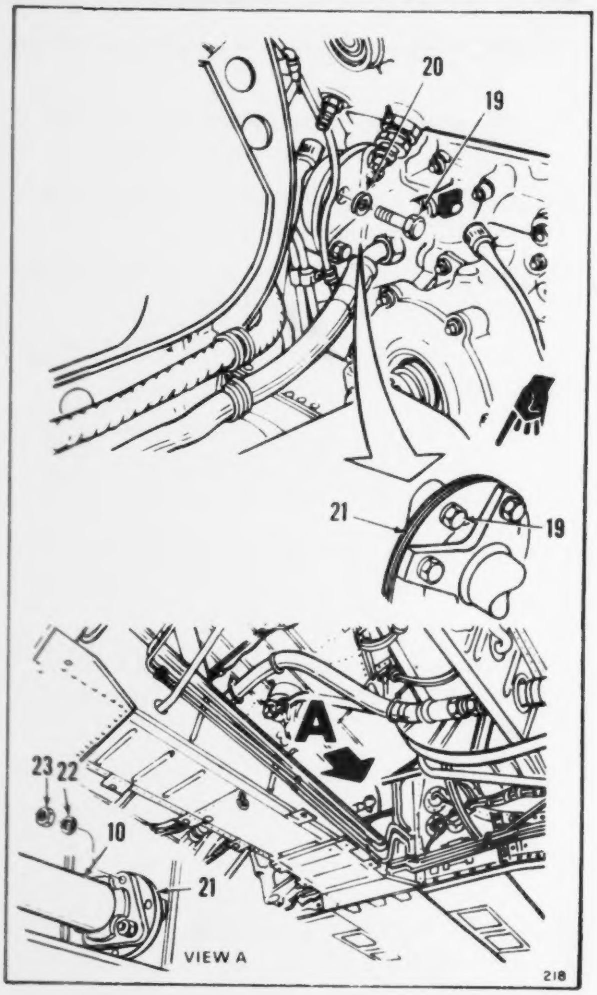
## 6-77 INSTALL COMBINING TRANSMISSION (Continued) 6-77

10. Coat three bolts (19) with oil (E254). **Install three bolts** and special washers (20) through aft adapter assembly (21) and shaft (10). **Install** three washers (22) and **nuts (23).**

**CAUTION**

**Do not allow bolt to turn. If bolt turns, it can damage bolt and plates.**

11. Hold bolts (19) to keep bolts from turning. **Torque nuts (23) to 1050 inch-pounds.**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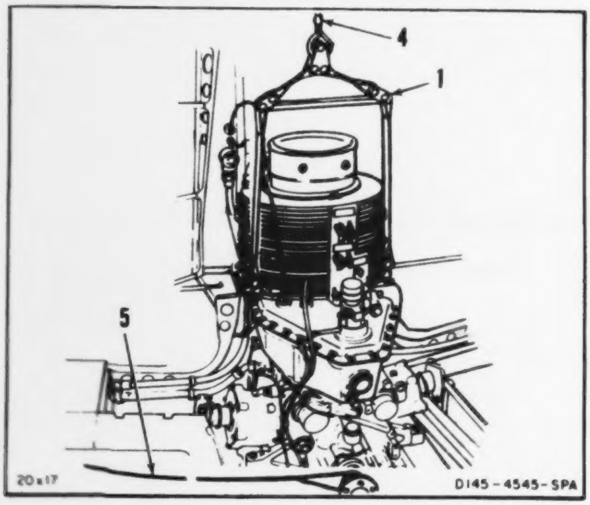
12. Remove hoist hook (4) and sling (1). Remove two rope guide lines (5).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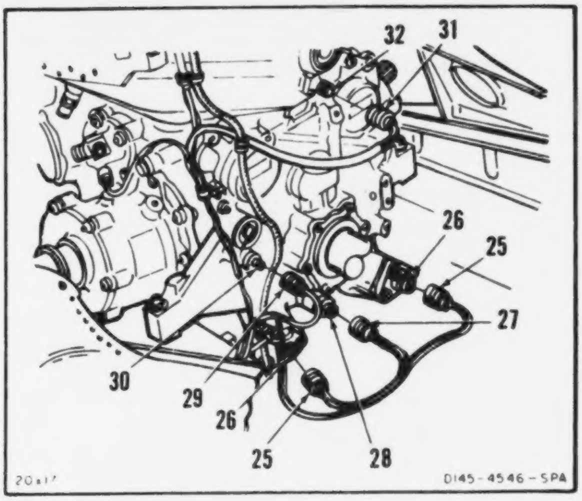
## 6-77 INSTALL COMBINING TRANSMISSION (Continued) 6-77

13. **Connect two connectors (25)** to COMB DEBRIS SCREEN receptacles (26).
14. **Connect connector (27)** to COMP CHIP DETECTOR receptacle (28).
15. **Connect connector (29)** to COMB PRESS SWITCH-AUX receptacle (30).
16. **Connect connector (31)** to COMB XMSN TEMP BULB receptacle (32).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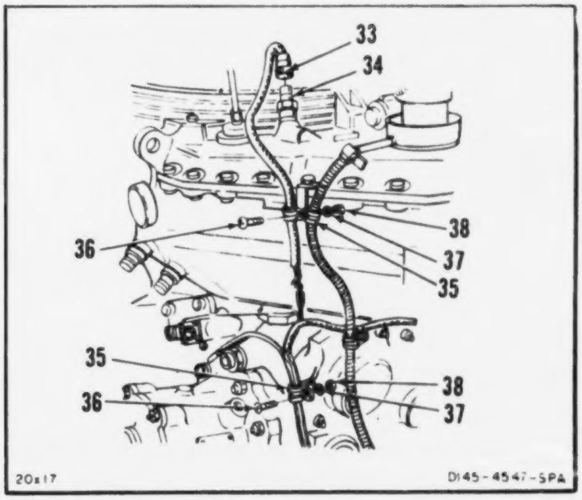
17. **Connect electrical connector (33)** to COMB PRESS SWITCH-MAIN receptacle (34).
18. **Connect two clamps (35)** with screws (36), washers (37), and nuts (38) **at three places.**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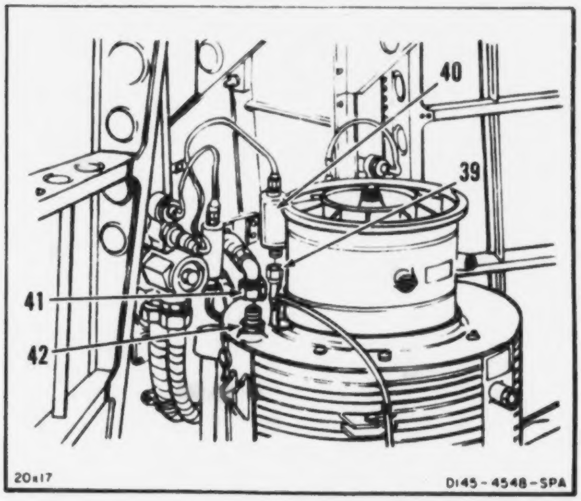
19. **Connect oil hose (39)** to transducer (40).
20. **Connect oil hose (41)** to reducer (42).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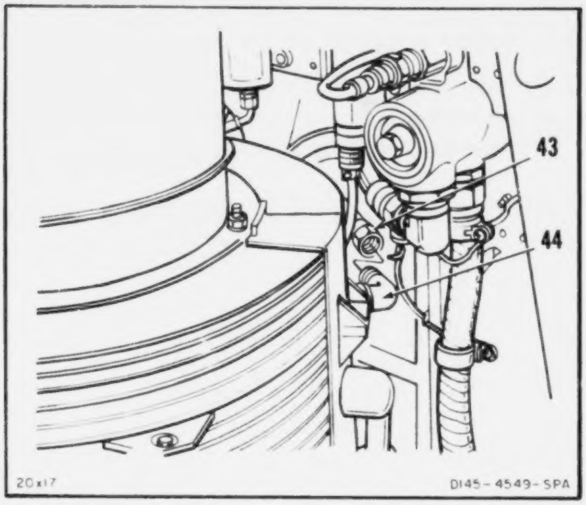
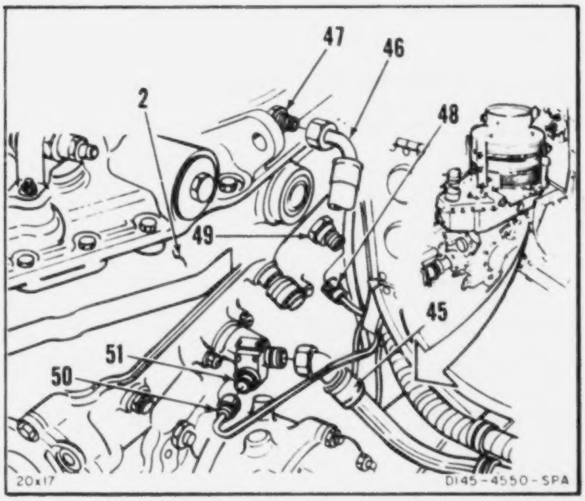
21. **Connect oil hose (43)** to elbow (44).


43
44
20x17
D145-4549-SPA

**NOTE**

Connect hose quickly to prevent oil loss.

22. Remove cap and **connect oil hose (45)** to left side of transmission (2). Use container to catch spilled oil.
23. **Connect breather hose (46)** to reducer (47).
24. **Connect connector (48)** to LH ENGINE XMSN TEMP BULB receptacle (49). **Connect connector (50)** to LH ENG XMSN INDICATING SCREEN receptacle (51).


47
46
2
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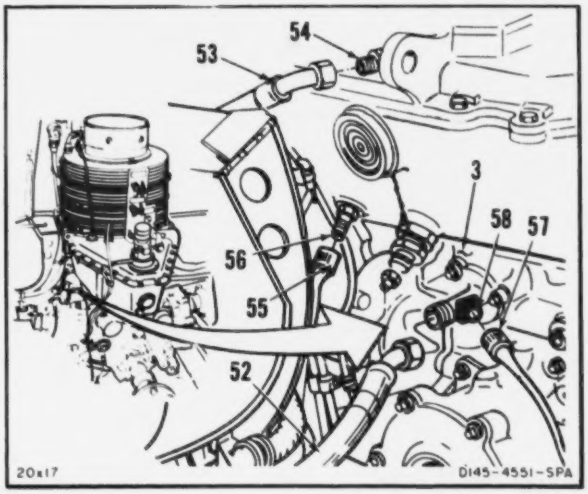
49
45
51
50
20x17
D145-4550-SPA

**NOTE**

Connect hose quickly to prevent oil loss.

25. Remove cap and **connect oil hose (52)** to right side of transmission (3). Use container to catch spilled oil.
26. **Connect breather hose (53)** to reducer (54).
27. **Connect connector (55)** to RH ENGINE XMSN TEMP BULB receptacle (56). **Connect connector (57)** to RH ENG XMSN INDICATING SCREEN receptacle (58).


54
53
3
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56
55
52
20x17
D145-4551-SPA

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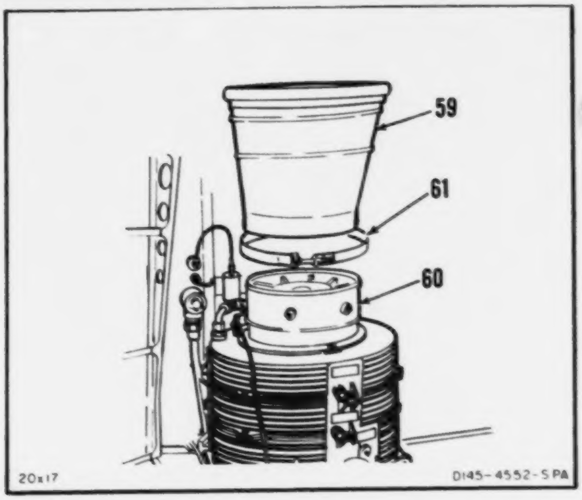
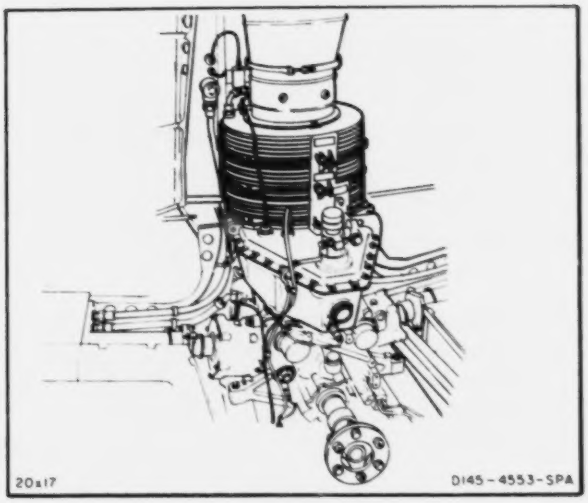
## 6-77 INSTALL COMBINING TRANSMISSION (Continued) 6-77

28. **Install duct (59)** on fan (60).

29. Coat thread of clamp (61) with oil (E254). **Install clamp** around duct (59) and fan (60). **Torque clamp to 35 inch-pounds.**



*INSPECT*



FOLLOW-ON MAINTENANCE:

Install No. 7 drive shaft (Task 6-19).

Install left and right engine shaft and combining transmission adapter assembly (Task 6-32).

Install aft pylon lower fairing (Task 2-2).

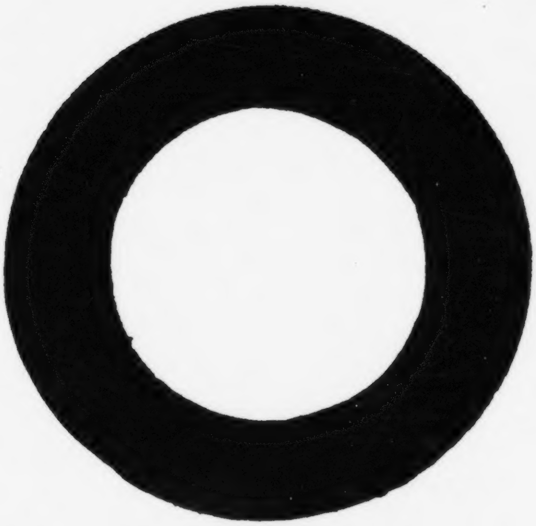
Service transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

Perform ground run (TM 55-1520-240-10).

**END OF TASK**

# SECTION VI
## AFT ROTARY-WING DRIVE TRANSMISSION



## 6-78 REMOVE AFT TRANSMISSION SUMP 6-78

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Container, 14-Quart (3)

***Materials:***

None

***Personnel Required:***

Medium Helicopter Repairer

***Equipment Condition:***

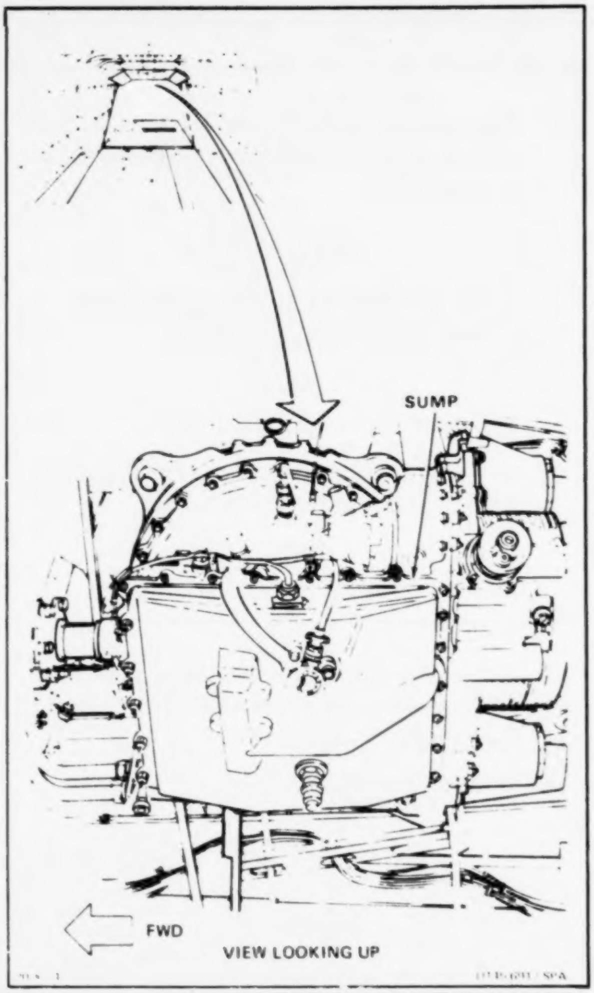
Battery Disconnected (Task 1-39)

Electrical Power Off

Baffles Under Aft Transmission Open (Task 2-2)

Aft Transmission Drip Tray Removed (Task 2-3)

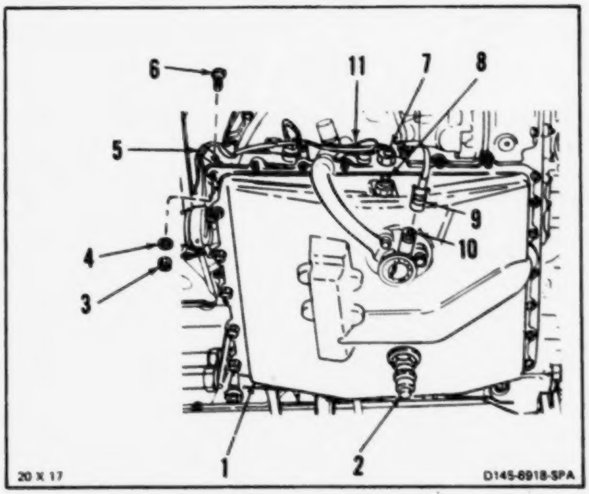
Cargo Ramp Open and Level (TM 55-1520-240-T)



**NOTE**

Sump holds about 30 quarts of oil.

1. Position container under sump (1).
2. Push in drain valve (2), twist it, and pull. **Let oil drain into container.** Push in valve, twist it, and pull down to close.
3. **Remove** nuts (3), washers (4), **wire clamp plates (5), and bolts (6)** from three places at left and forward edges of sump (1).
4. **Disconnect connector (7)** from temperature probe receptacle (8). **Disconnect connector (9)** from chip detector receptacle (10). Secure wires (11) above sump (1).



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## 6-78 REMOVE AFT TRANSMISSION SUMP (Continued) 6-78

5. **Remove 21 nuts (3)** and washers (4) from around sump (1). **Remove 14 bolts (6)** and washers (12).

**CAUTION**

**Be careful not to damage gasket seal when lowering sump.**

**NOTE**

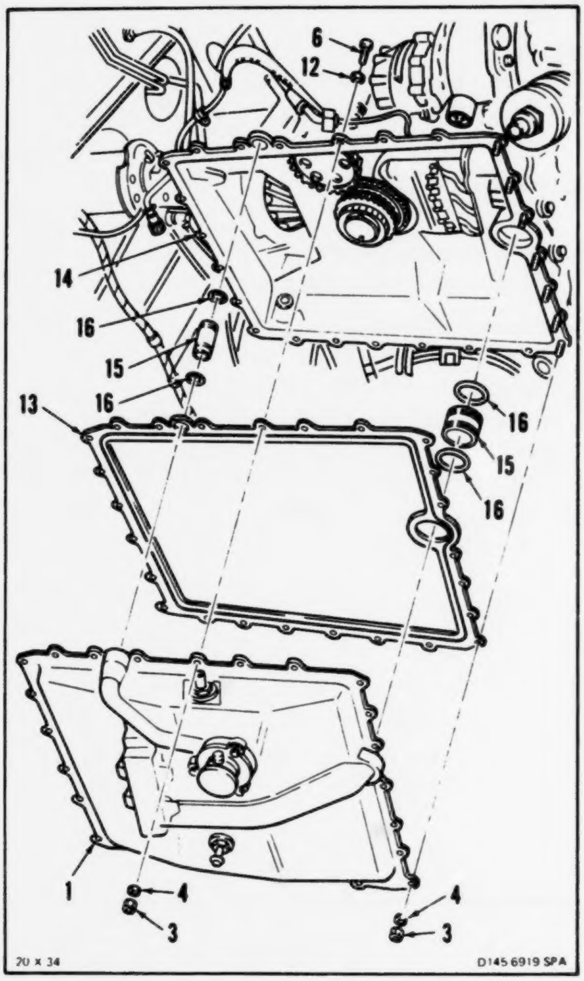
Do not tilt sump. Oil can spill.

6. Lower and **remove sump (1) and gasket seal (13)** from transmission (14).

**NOTE**

Tubes may stay in sump or transmission.

7. If two oil transfer tubes (15) and packings (16) remain in transmission (14), remove them. Install in sump )1).
8. Drain oil from sump (1).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-79 DISASSEMBLE AFT TRANSMISSION SUMP 6-79

INITIAL SETUP

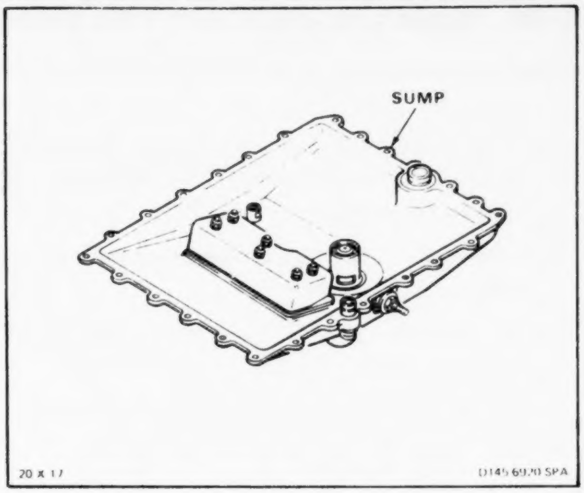
***Applicable Configurations:***
All

***Tools:***
Airframe Repairer's Tool Kit,
NSN 5180-00-323-4876
Open End Wrench, 1 3/8-Inch

***Materials:***
None

***Personnel Required:***
Aircraft Structure Repairer

***Equipment Condition:***
Off Helicopter Task


SUMP
20 X 17
D145 6920 SPA

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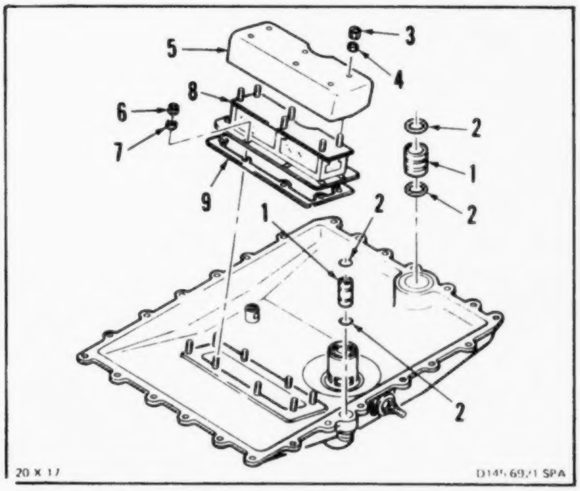
1. **Remove two oil transfer tubes (1)** and four packings (2).
2. Remove six nuts (3) and washers (4) from screen cap (5). **Remove cap.**
3. Remove eight nuts (6) and washers (7) from inlet screen (8). **Remove screen and gasket seal (9).**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20 X 17
D145 6921 SPA

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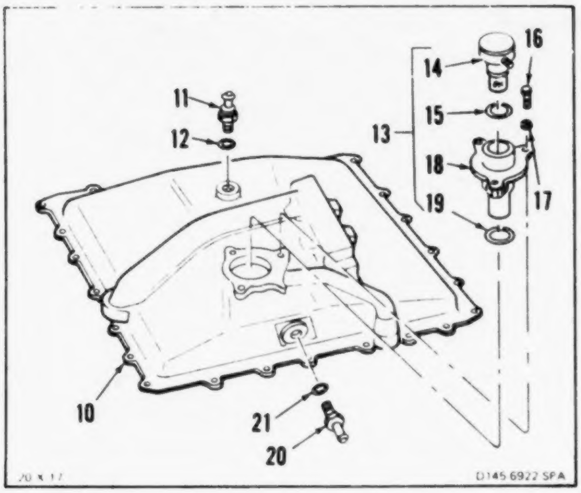
## 6-79 DISASSEMBLE AFT TRANSMISSION SUMP (Continued) 6-79



4. Turn sump (10) over 180 degrees. Remove lockwire from drain valve (11). **Remove drain valve** and packing (12).
5. **Remove detection screen and chip detector (13)** as follows:
   a. Push in cap (14), twist to left, and pull to remove cap and packing (15).
   b. Remove lockwire from three bolts (16). Remove bolts and washers (17).
   c. Remove housing (18) and packing (19).
6. Remove lockwire from temperature probe (20). **Remove temperature probe** and packing (21).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-80 ASSEMBLE AFT TRANSMISSION SUMP 6-80

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Airframe Repairer's Tool Kit, NSN 5180-00-323-4876
Deep Socket, 1 3/8-Inch
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Source of Low-Pressure Compressed Air

***Materials:***
Lockwire (E231)
Dry Cleaning Solvent (E162)
Gloves (E186)
Cloths (E120)
Oil (E254)

***Parts:***
Packings

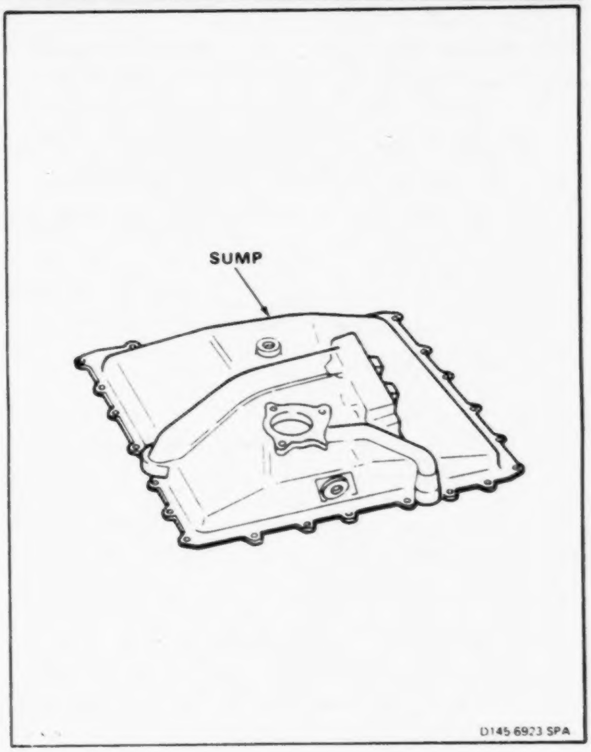
***Personnel Required:***
Aircraft Structure Repairer
Inspector

***References:***
TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes. Use goggles when using low pressure compressed air.**



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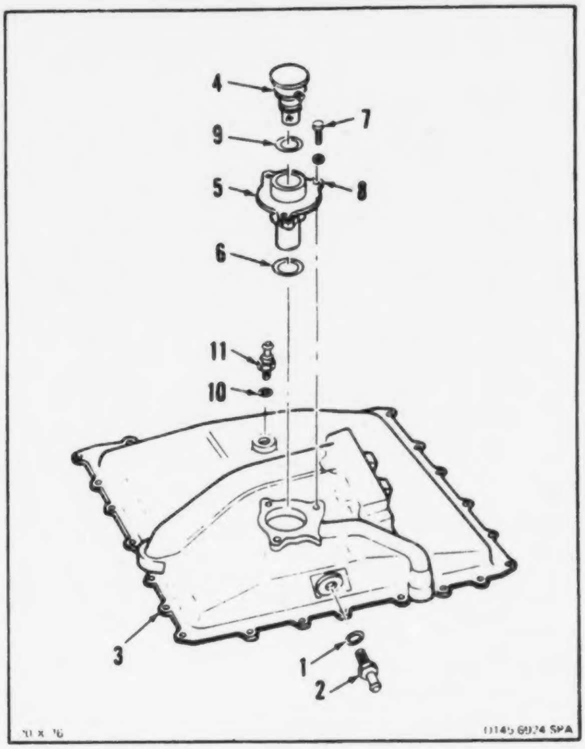
## 6-80 ASSEMBLE AFT TRANSMISSION SUMP (Continued) 6-80



1. Coat packing (1) and thread of temperature probe (2) with oil (E254). Install packing on probe. **Install temperature probe** in sump (3). **Torque probe to 75 inch-pounds.**
2. Lockwire probe (2) to sump (3). Use lockwire (E231).
3. If cap (4) and housing (5) are joined, push cap into housing, twist, and pull. Remove cap from housing.

**NOTE**

If cap and housing are new, cleaning is not needed.

4. Clean cap (4) and housing (5). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
5. Install packing (6) on housing (5). **Install housing in sump (3). Install three bolts (7) and washers (8). Torque bolts to 60 inch-pounds.**
6. Lockwire three bolts (7) together. Use lockwire (E231).
7. Press center of cap (4) in. **Install cap** and packing (9) in housing (5). Push in cap until center snaps out flush with outside of housing.
8. Coat packing (10) and thread of drain valve (11) with oil (E254). Install packing on valve. **Install drain valve** in sump (3). **Torque valve to 75 inch-pounds.**
9. Lockwire drain valve (11) to sump (3). Use lockwire (E231).

*GO TO NEXT PAGE*

## 6-80 ASSEMBLE AFT TRANSMISSION SUMP (Continued) 6-80

***INSPECT***

10. Turn sump (3) over 180 degrees.

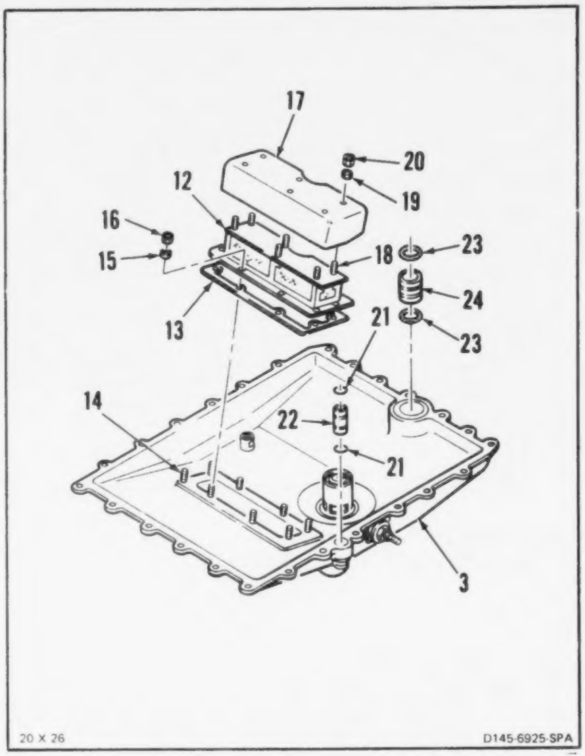
**WARNING**

**Do not use more than 30 psi compressed air for cleaning. Debris propelled under pressure can cause injury to eyes. Use source of compressed air under 30 psi and eye protection to prevent injury to personnel.**

**NOTE**

If screen is new, cleaning is not needed.

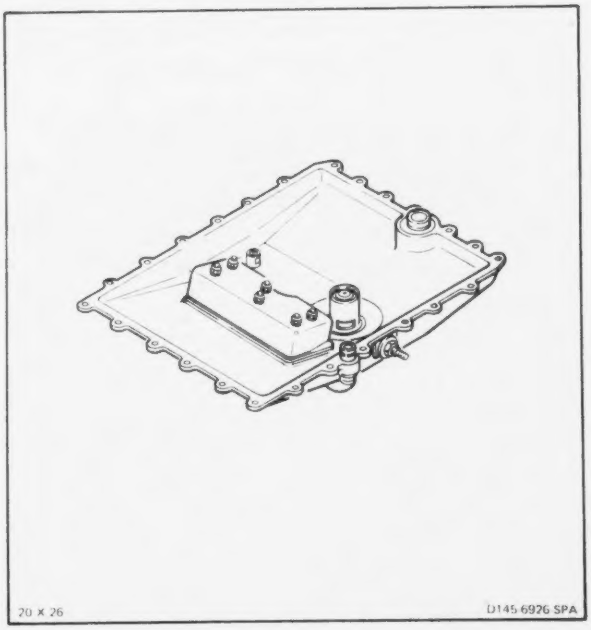
11. Clean inlet screen (12) with dry cleaning solvent (E162) and cloths (E120). Dry screen with compressed air. Wear gloves (E186) and goggles.
12. **Install gasket seal (13) and inlet screen (12)** on eight studs (14). Install eight washers (15) and nuts (16). **Torque nuts to 20 inch-pounds.**
13. **Install screen cap (17)** on six studs (18). Install six washers (19) and nuts (20). **Torque nuts to 20 inch-pounds.**
14. Install two packings (21) on transfer tube (22). **Install transfer tube in sump (3).**
15. Install two packings (23) on transfer tube (24). **Install transfer tube in sump (3).**



***INSPECT***

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-81 INSTALL AFT TRANSMISSION SUMP 6-81

INITIAL SETUP

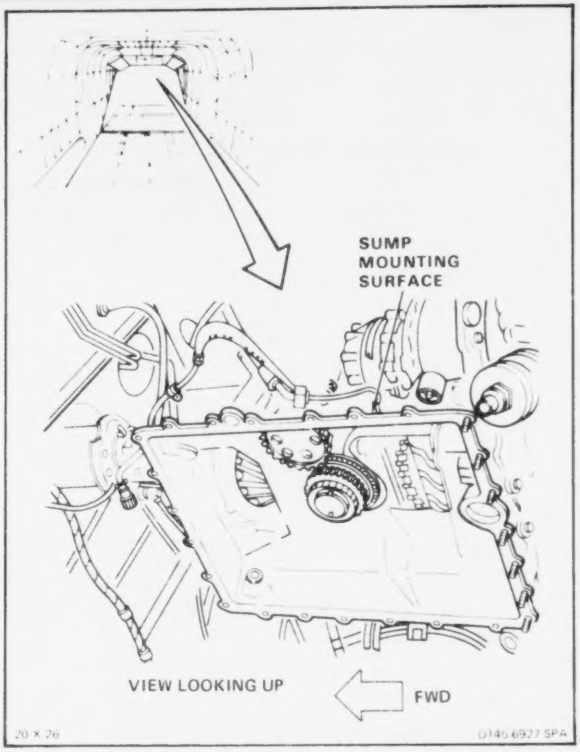
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

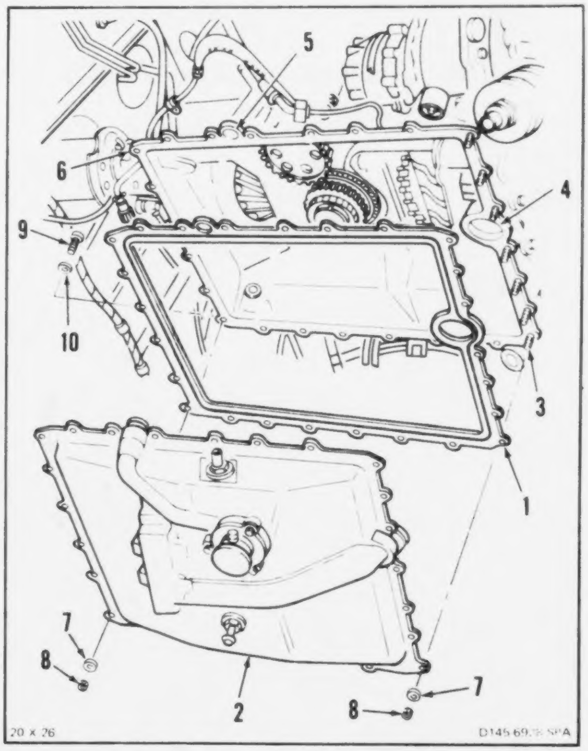
***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***References:***
TM 55-1520-240-23P


SUMP
MOUNTING
SURFACE
VIEW LOOKING UP
FWD
20 x 26
D145 6927 SPA

1. Position gasket seal (1) on sump (2).
2. Align sump (2) and gasket seal (1) with seven studs (3) and two transfer tube ports (4 and 5).
3. **Position sump (2) and seal (1) against transmission (6). Install** seven washers (7) and **nuts (8) finger-tight** on studs (3). **Install bolt (9), washers (10 and 7) and nut (8) finger-tight** at right forward corner of sump.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20 x 26

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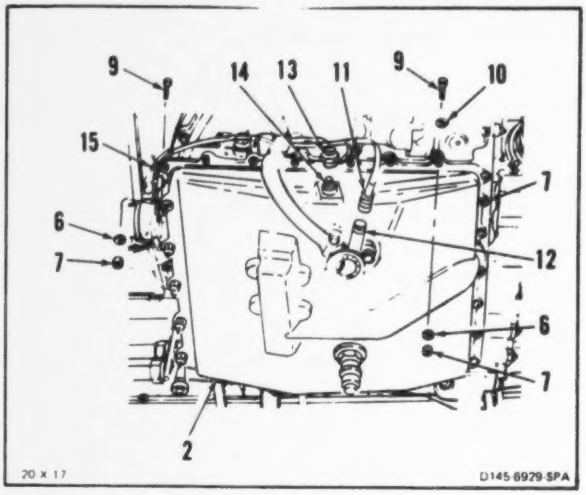
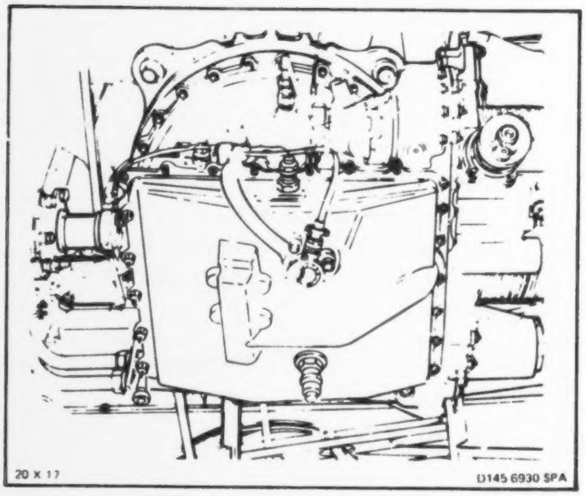
## 6-81 INSTALL AFT TRANSMISSION SUMP (Continued) 6-81

4. **Connect connector (11)** to chip detector receptacle (12). **Connect connector (13)** to temperature probe receptacle (14).
5. **Install bolts (9), wire clamp plates (15),** washers (6) and nuts (7) at three places at forward and left edges of sump (2).
6. **Install bolts (9),** washers (10 and 6) and nuts (7) at 13 places around sump (2).
7. **Torque 24 nuts (7) to 60 inch-pounds.**



*INSPECT*



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-81.1 CLEAN AND INSPECT AFT TRANSMISSION OIL FILLER SCREEN 6-81.1

INITIAL SETUP

***Applicable Configurations:***
All

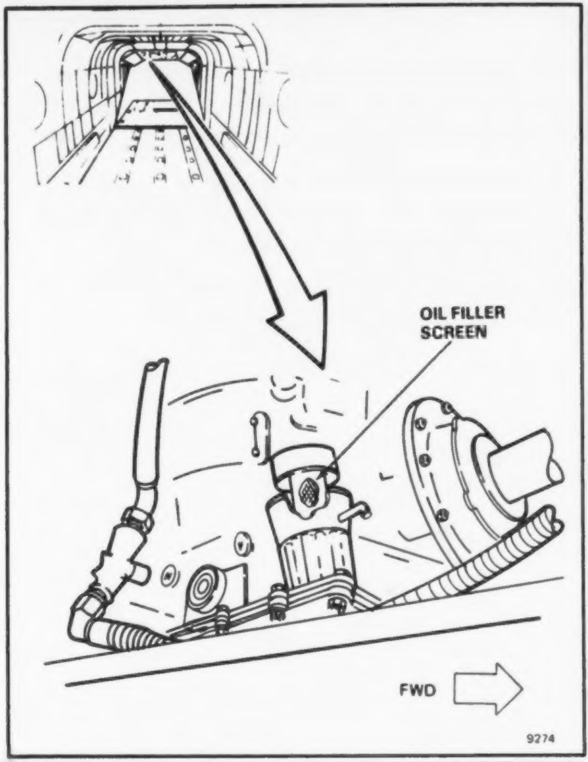
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
Task 6-108
TM 55-1520-240-23P

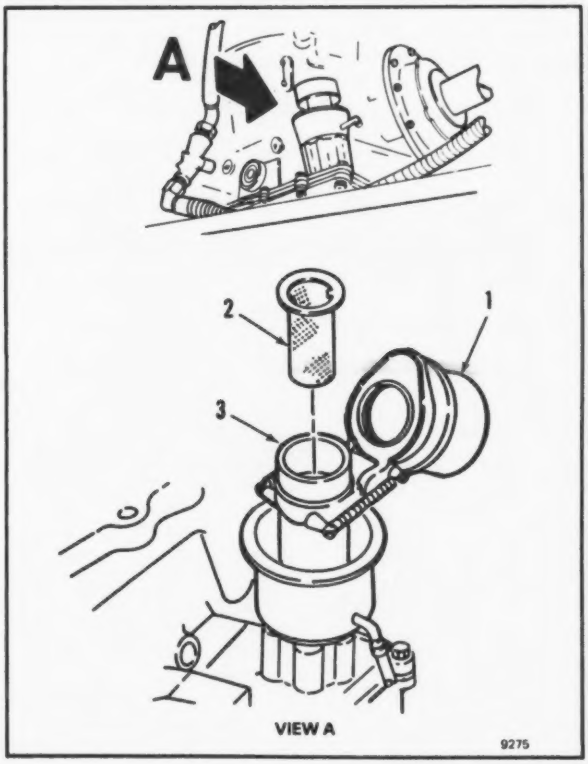
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Right Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



**WARNING**

**Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.**

1. Open cap assembly (1). **Remove screen (2)** from neck (3).
2. Close cap assembly (1).



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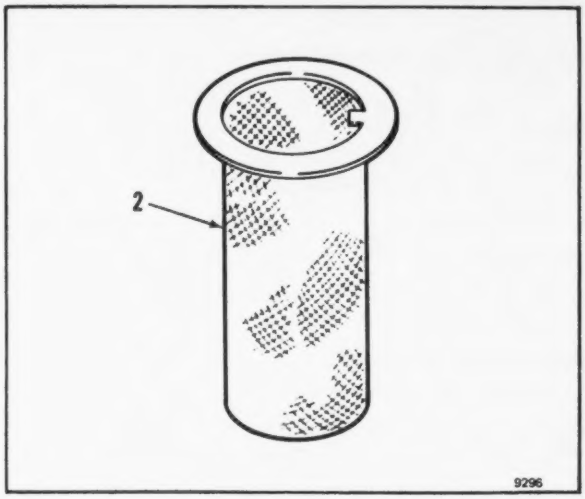
## 6-81.1 CLEAN AND INSPECT AFT TRANSMISSION OIL FILLER SCREEN (Continued) 6-81.1

3. **Check screen (2)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

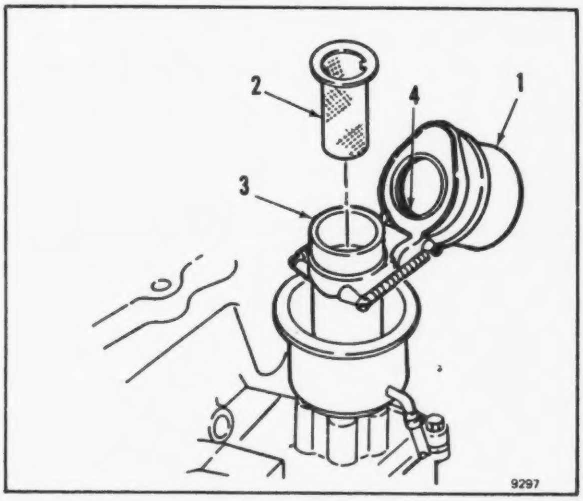
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. **Inspect screen (2)** for tears. There shall be no tears.



6. Open cap assembly (1). **Install screen (2)** in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.



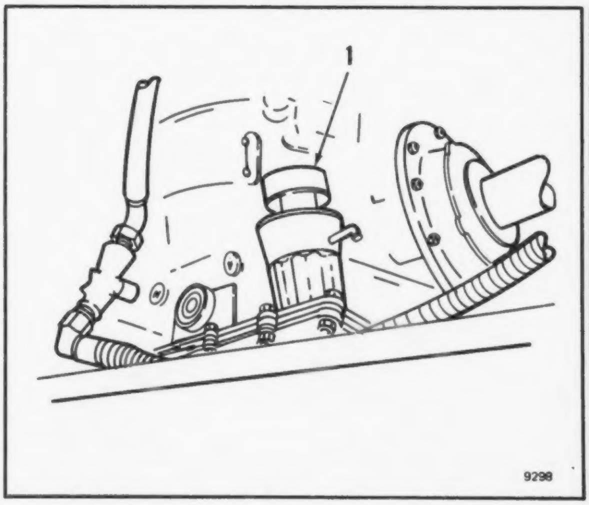
8. Close cap assembly (1).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-81.2 REMOVE AFT TRANSMISSION OIL FILLER ASSEMBLY 6-81.2

INITIAL SETUP

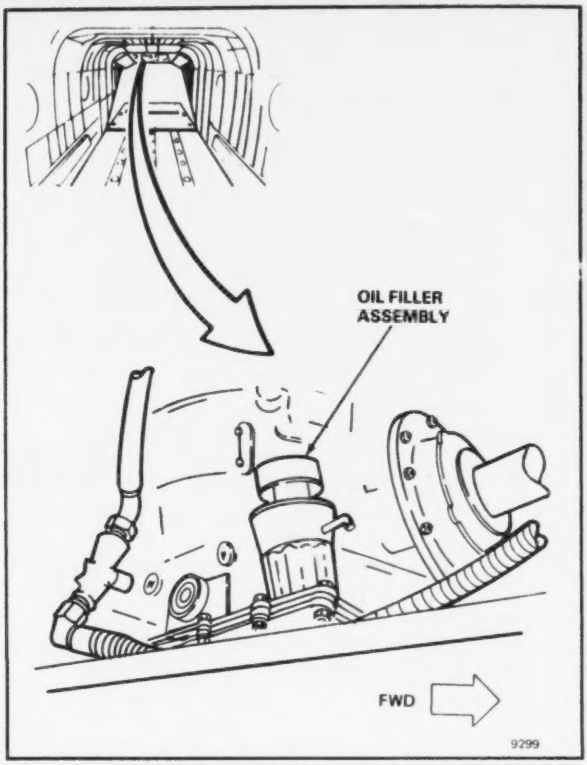
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

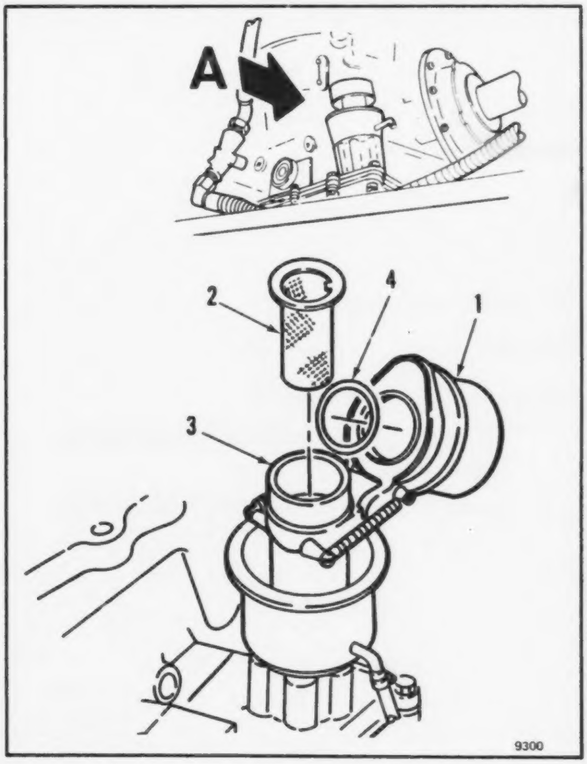
***Materials:***
Barrier Material (E80)
Masking Tape (E388)

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Right Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



1. Open cap assembly (1). **Remove screen (2)** from neck (3). **Remove packing (4)** from underside of cap.



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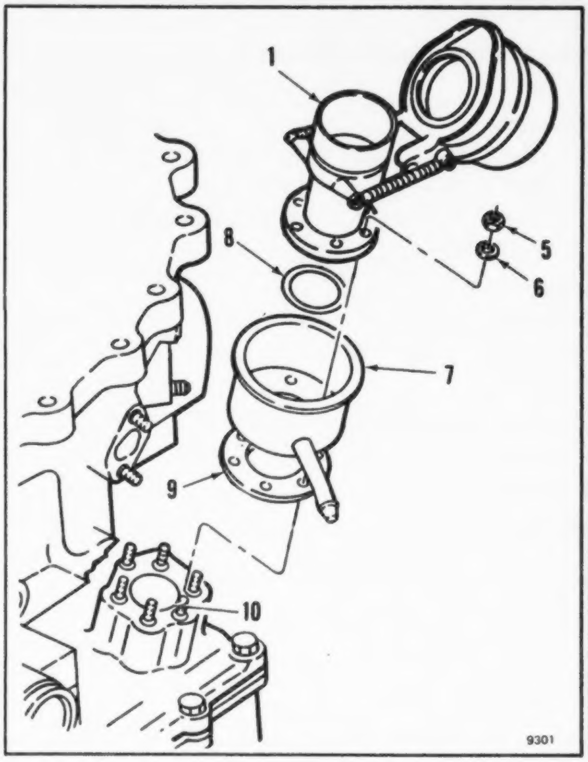
## 6-81.2 REMOVE AFT TRANSMISSION OIL FILLER ASSEMBLY (Continued) 6-81.2

2. Remove six nuts (5) and washers (6) from inside cup (7). **Remove cap assembly (1)** and packing (8).
3. **Remove cup and gasket (9).**
4. **Cover cavity (10)** with barrier material (E80) and masking tape (E388).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-81.3 INSTALL AFT TRANSMISSION OIL FILLER ASSEMBLY 6-81.3

INITIAL SETUP

***Applicable Configurations:***
All

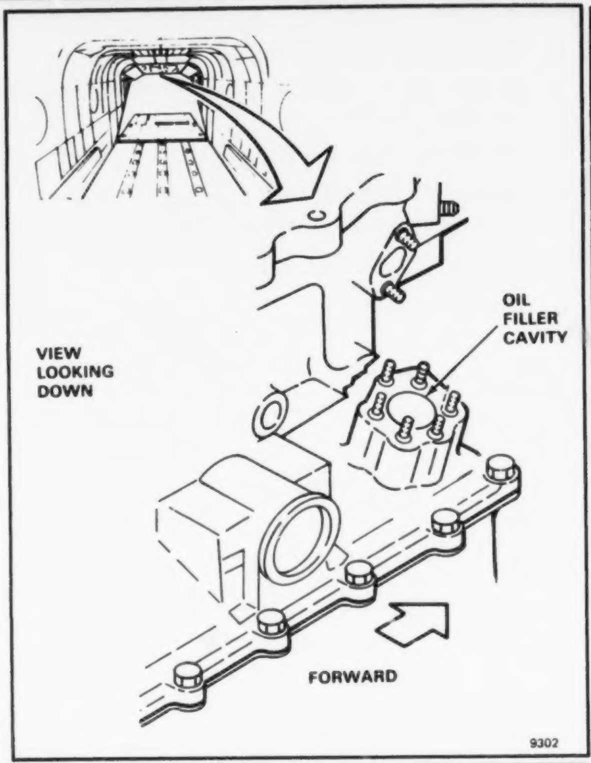
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Workstand

***Materials:***
None

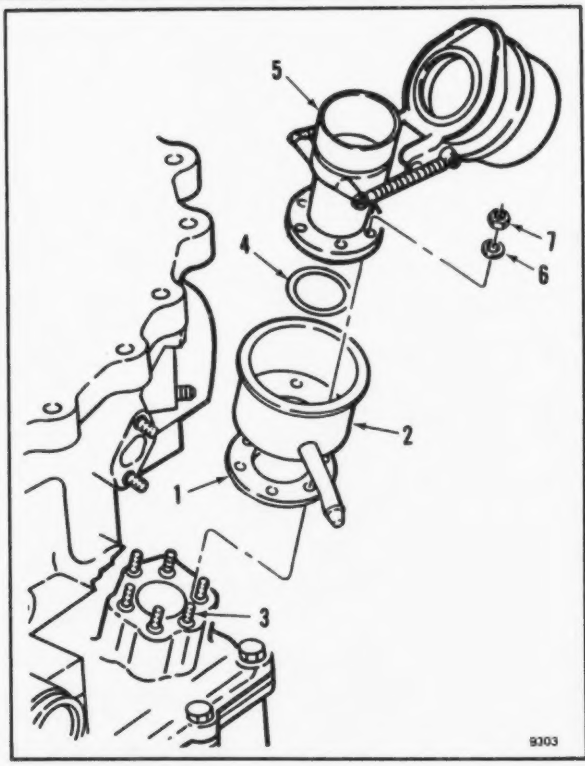
***Parts:***
Packing

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P


VIEW
LOOKING
DOWN
OIL
FILLER
CAVITY
FORWARD
9302

1. **Install gasket (1) and cup (2)** on six studs (3).
2. **Install packing (4)** on bottom of cap assembly (5). **Install cap** assembly on studs (3).
3. Install six washers (6) and nuts (7) on studs (3). **Torque nuts to 20 inch-pounds.**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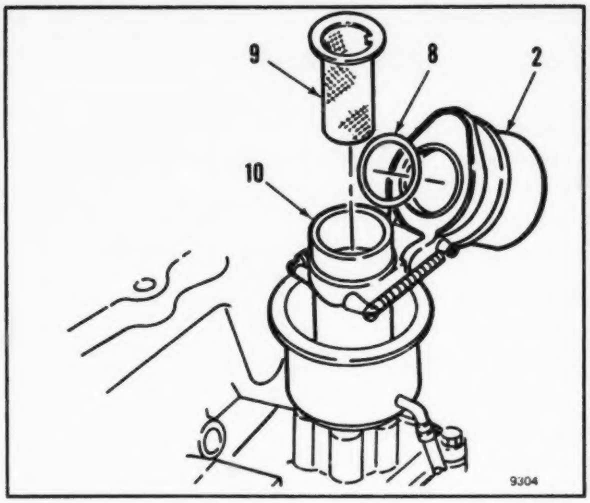
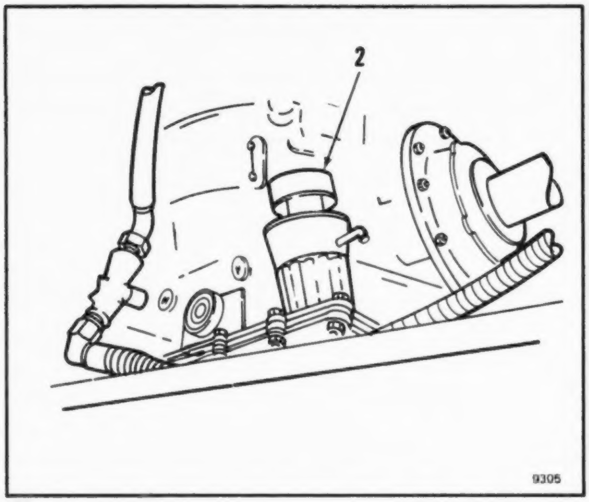
## 6-81.3 INSTALL AFT TRANSMISSION OIL FILLER ASSEMBLY (Continued) 6-81.3

4. Open cap assembly (5). **Install packing (8)** on bottom of cap.
5. **Install screen (9)** in neck (10).



6. **Close cap** assembly (5).

***INSPECT***



FOLLOW-ON MAINTENANCE:

Close right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-82 REMOVE AFT TRANSMISSION INPUT SHAFT SEAL 6-82

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Workstand
1/4-28 Bolt, At Least One Inch Long (3)

***Materials:***

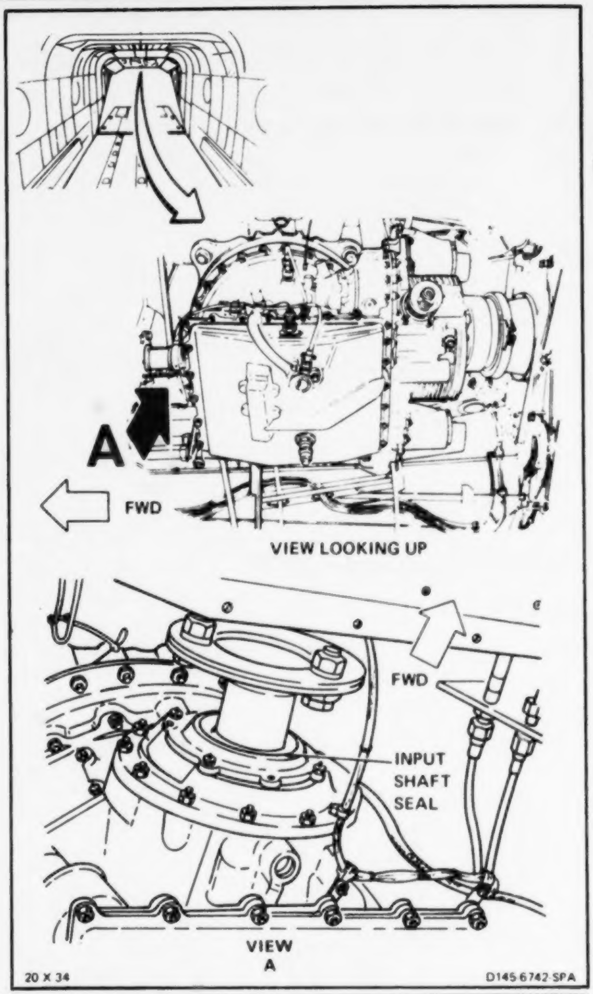
None

***Personnel Required:***

Aircraft Powertrain Repairer

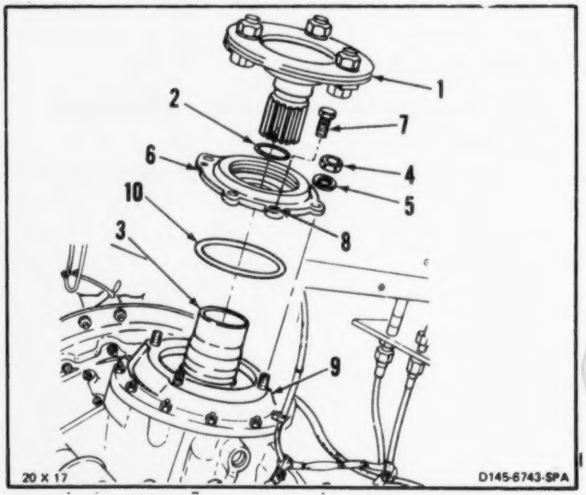
***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
No. 9 Drive Shaft Removed (Task 6-21)


A
FWD
VIEW LOOKING UP
FWD
INPUT SHAFT SEAL
VIEW A
20 X 34
D145-6742-SPA

---

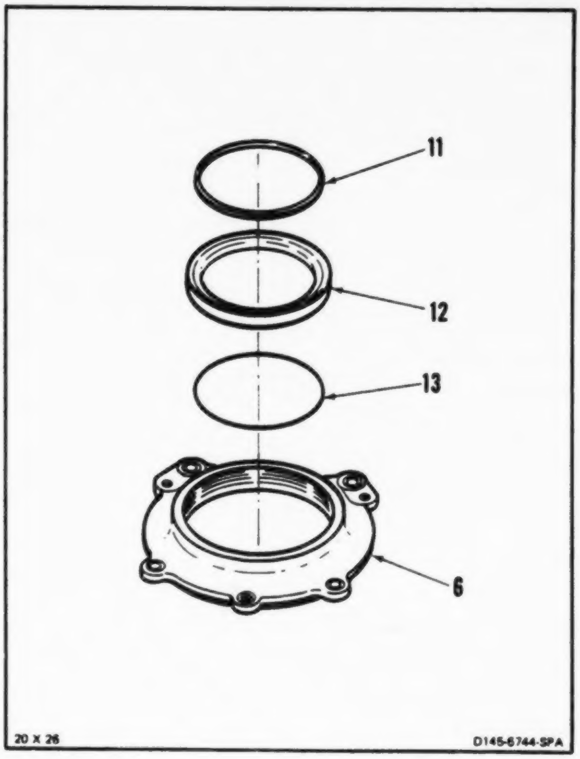
1. **Remove adapter assembly (1)** and packing (2) from input shaft (3). Do not disturb position of input shaft.
2. Remove four nuts (4) and washers (5) from retainer (6).
3. Install three 1/4-28 bolts (7) in threaded holes (8). Turn bolts to **jack retainer (6) off transmission (9).**
4. Remove packing (10) from retainer (6).


1
2
7
6
4
10
5
3
8
9
20 X 17
D145-6743-SPA

*GO TO NEXT PAGE*

## 6-82 REMOVE AFT TRANSMISSION INPUT SHAFT SEAL (Continued) 6-82

5. Remove retaining ring (11) from retainer (6). **Remove seal (12)** and packing (13).

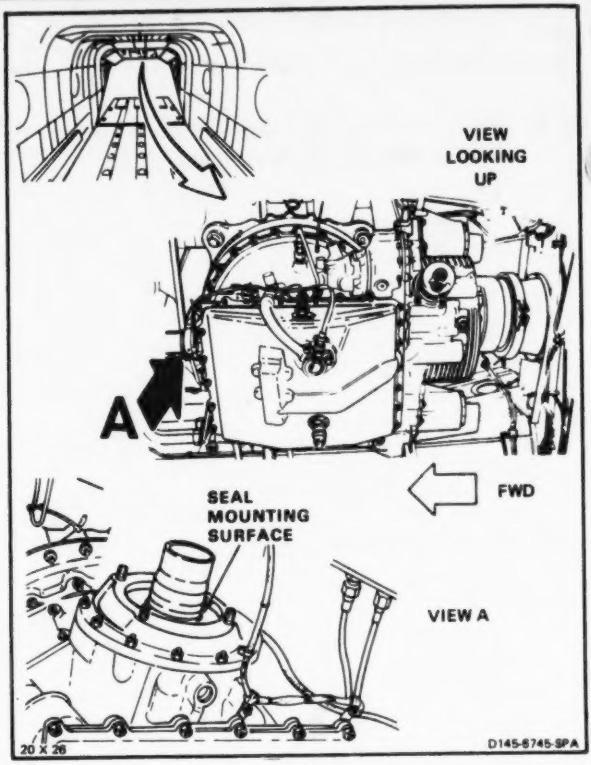

11
12
13
6
20 X 26
D145-6744-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-83 INSTALL AFT TRANSMISSION INPUT SHAFT SEAL 6-83



INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 4 1/2-Inch OD, 1/4-Inch Wall Thickness, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)
Workstand

***Materials:***

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

***Parts:***

Packings

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

*GO TO NEXT PAGE*

## 6-83 INSTALL AFT TRANSMISSION INPUT SHAFT SEAL (Continued) 6-83

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

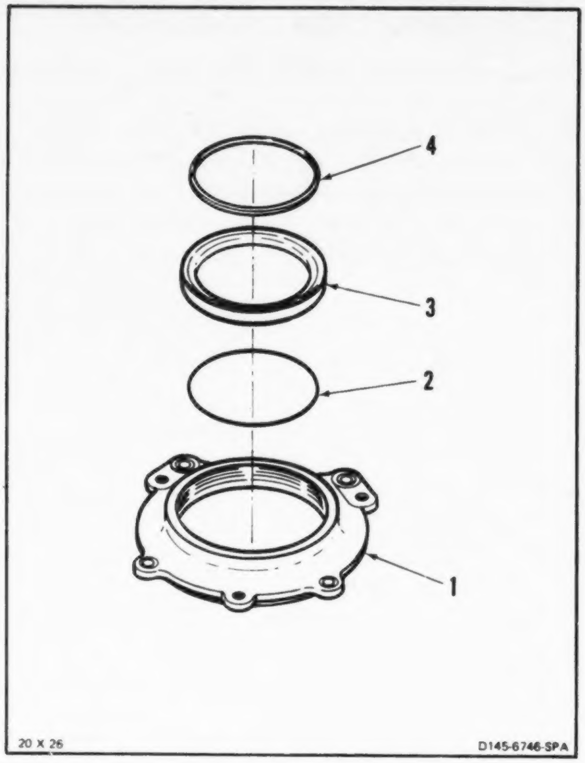
**WARNING**

**Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.**

**CAUTION**

**Do not heat retainer over 250°F (120°C). Damage to metal can occur.**

2. **Heat retainer (1) to 230 to 250°F (110 to 120°C).** Wear Kevlar gloves (E187). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube to seat seal.
5. Install retaining ring (4).

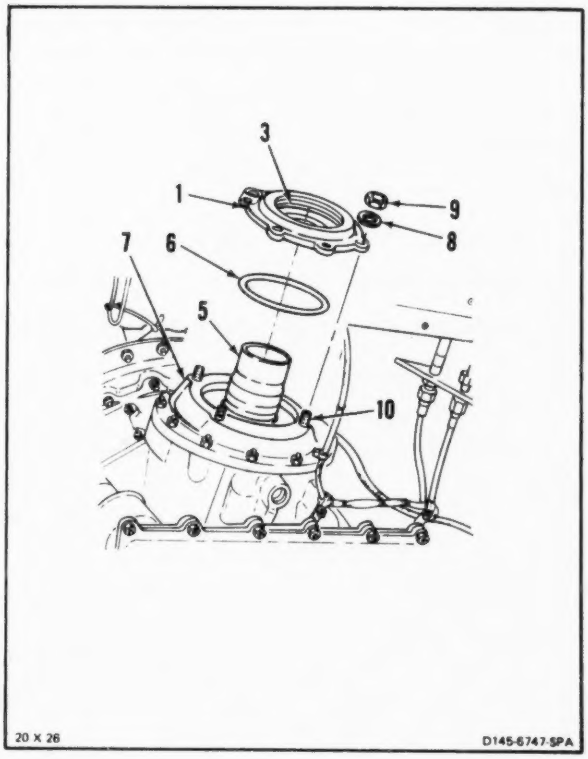


6. Install packing (5) on retainer (1).

**NOTE**

If seal and shaft are not clean and dry, leakage can occur.

7. Clean seal mating surface of shaft (6) with dry cleaning solvent (E162). Wipe seal (3) with clean cloth (E120). Wear gloves (E186).
8. Install retainer (1) on transmission (7). Do not disturb position of input shaft (5).
9. **Install four washers (8) and nuts (9)** on studs (10). **Torque nuts to 60 inch-pounds** .



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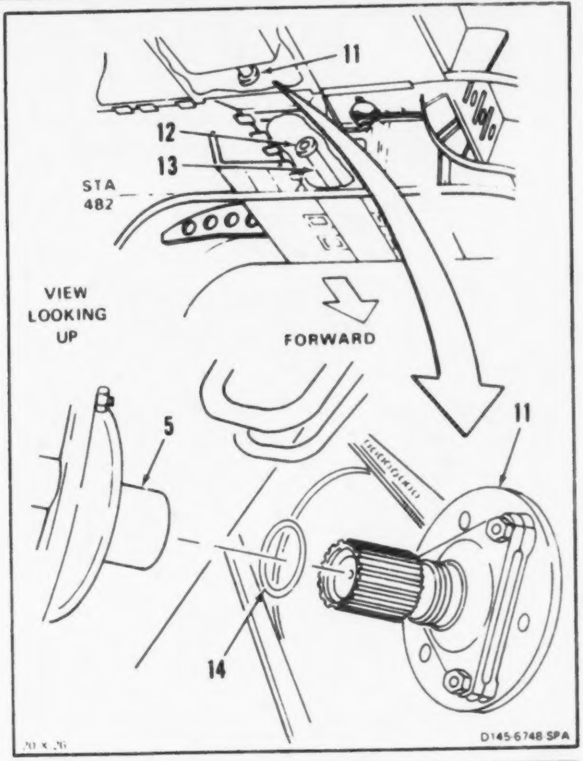
## 6-83 INSTALL AFT TRANSMISSION INPUT SHAFT SEAL (Continued)

10. Align adapter assembly (11) with adapter assembly (12) of No. 8 drive shaft (13). **Install adapter assembly (11)** and packing (14) on input shaft (5). Do not disturb position of input shaft or No. 8 drive shaft.


11
12
13
STA 482
VIEW LOOKING UP
FORWARD
11
5
14
20 x 26
D145-6748 SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

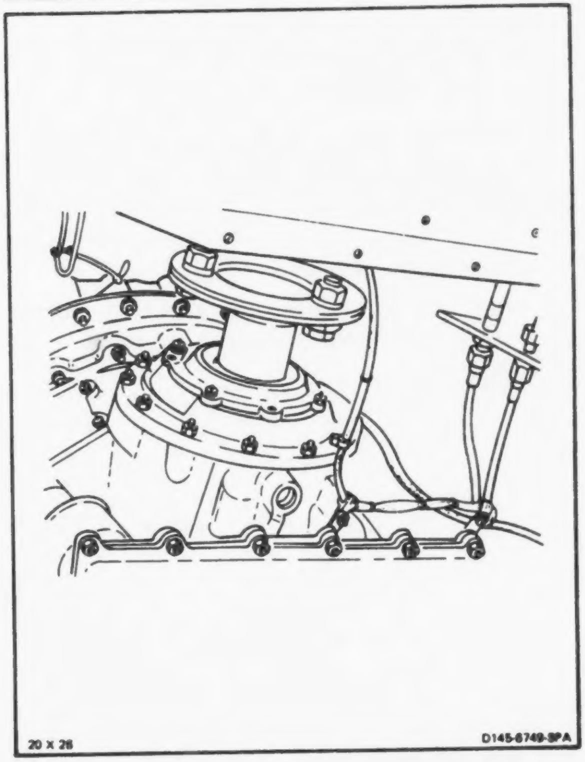
Install No. 9 drive shaft (Task 6-29).

Perform ground run (TM 55-1520-240-10).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).


20 x 26
D145-6749-SPA

**END OF TASK**

## 6-84 REMOVE HYDRAULIC PUMP DRIVE SHAFT SEAL FROM AFT TRANSMISSION 6-84

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267

Awl

Workstand

Self-Tapping Screw, No. 6 (2)

***Materials:***

Lockwire (E232)

***Personnel Required:***

Aircraft Powertrain Repairer

***Equipment Condition:***

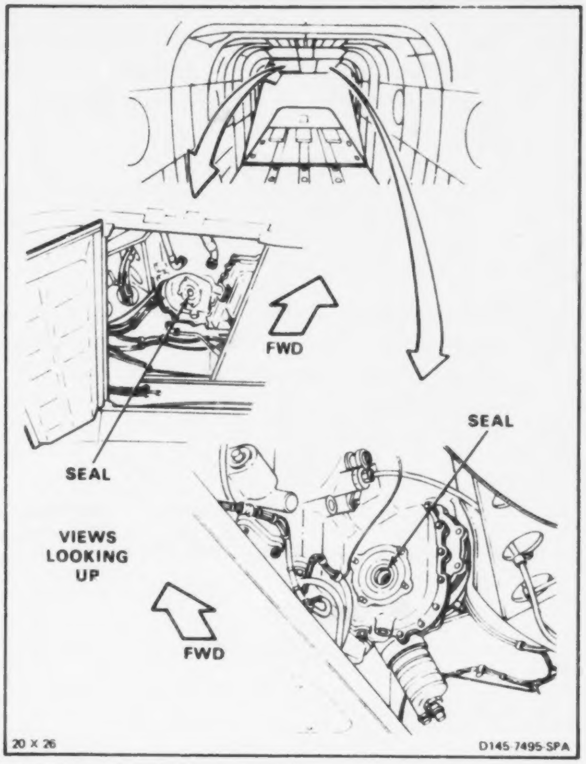
Battery Disconnected (Task 1-39)

Electrical Power Off

Cargo Ramp Open and Level (TM 55-1520-240-T)

Left or Right Baffle Under Aft Transmission Open (Task 2-2)

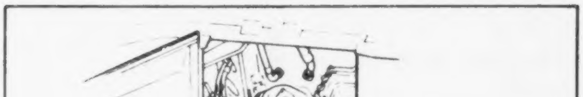
Flight Control Hydraulic System Pump (Left Side) or Utility Hydraulic System (Right Side) Removed (Task 7-22 or 7-150)



**NOTE**

Remove pump drive shaft seal from left or right side of transmission in same way. Right side shown here.

1. **Remove retaining ring (1).**
2. **Punch two holes (2)**, 180 degrees apart, in metal casing of seal (3). Use an awl.
3. **Screw a No. 6 self-tapping screw (4) securely in each of two holes (2).** Do not tighten head of screw against seal (3).



**GO TO NEXT PAGE**

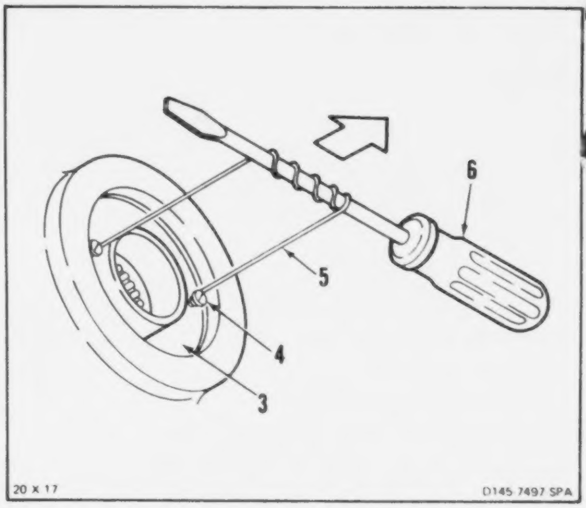
## 6-84 REMOVE HYDRAULIC PUMP DRIVE SHAFT SEAL FROM AFT TRANSMISSION (Continued) 6-84

4. Cut a piece of lockwire (5) about 24 inches long. Use lockwire (E232). **Wrap ends of lockwire under heads of two screws (4).**

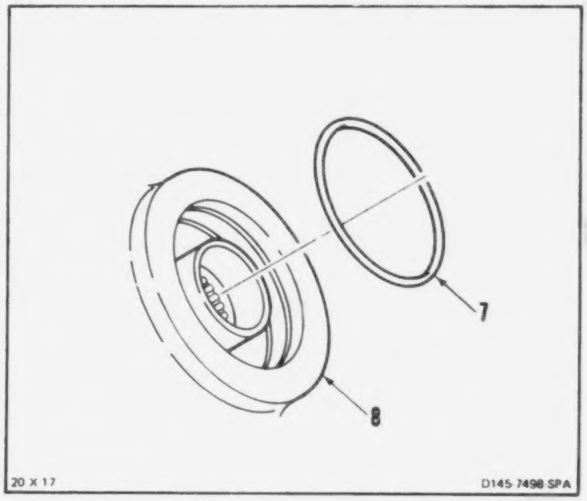
**CAUTION**

**Prying against transmission or drive shaft will cause damage.**

5. **Loop lockwire around a tool (6)**, such as screwdriver or wrench extension. **Remove seal (3)** by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. **Remove packing (7)** from transmission (8).

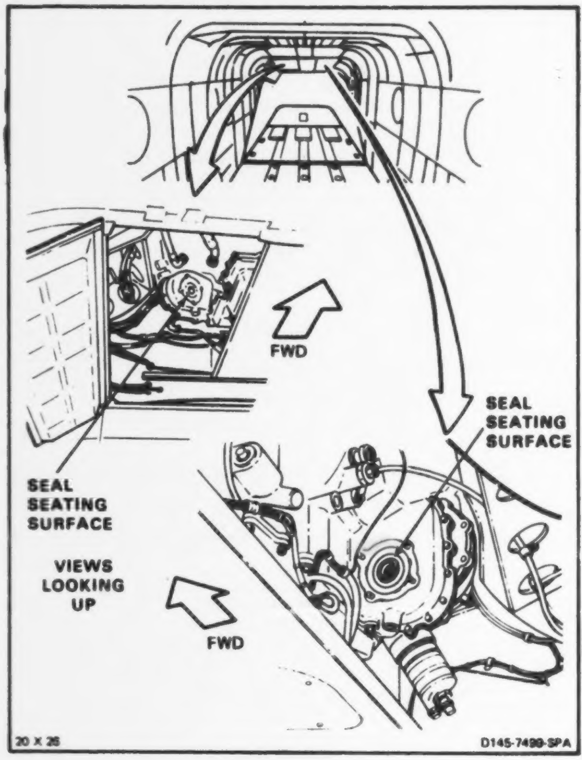


FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-85 INSTALL HYDRAULIC PUMP DRIVE SHAFT SEAL ON AFT TRANSMISSION 6-85


FWD
SEAL
SEATING
SURFACE
SEAL
SEATING
SURFACE
VIEWS
LOOKING
UP
FWD
20 X 26
D145-7499-SPA

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 2-Inch OD, 1/8-Inch Thick Wall, 1 to 6 Inches Long
Kevlar Gloves (E187)
Workstand

***Materials:***

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

***Parts:***

Packing

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1520-240-23P

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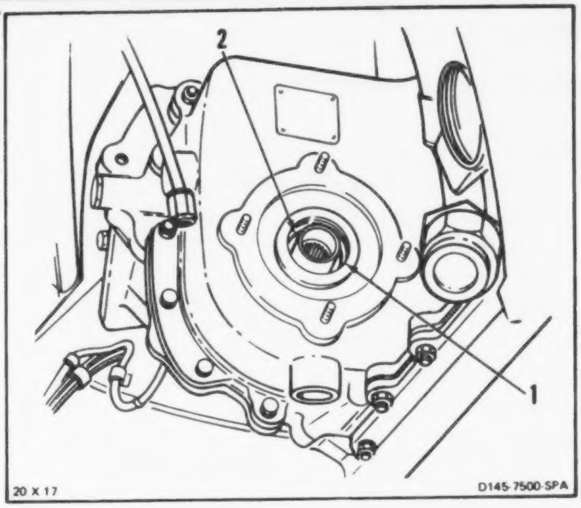
## 6-85 INSTALL HYDRAULIC PUMP DRIVE SHAFT SEAL ON AFT TRANSMISSION (Continued) 6-85



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes . Get medical attention for eyes.**

**NOTE**

Install pump drive shaft seal on left or right side of transmission in same way. Right side shown here.

1. **Clean seal seating area** of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

**WARNING**

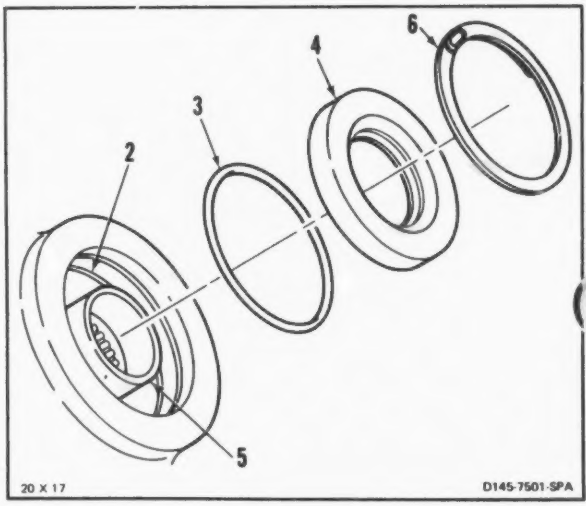
**Wear Kevlar gloves when working around heated area. Hot metal can burn hands.**

**CAUTION**

**Do not heat transmission over 250°F (120°C). Metal can be damaged.**

2. **Heat seal seating area (1)** to 230° to 250°F (110° to 120°C). Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.

3. Coat packing (3) with oil (E254). **Install packing** in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). **Install seal** or drive shaft, flat side out. Use aluminum tube to seat seal.
5. **Install retaining ring (6).**



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## 6-85 INSTALL HYDRAULIC PUMP DRIVE SHAFT SEAL ON AFT TRANSMISSION (Continued) 6-85

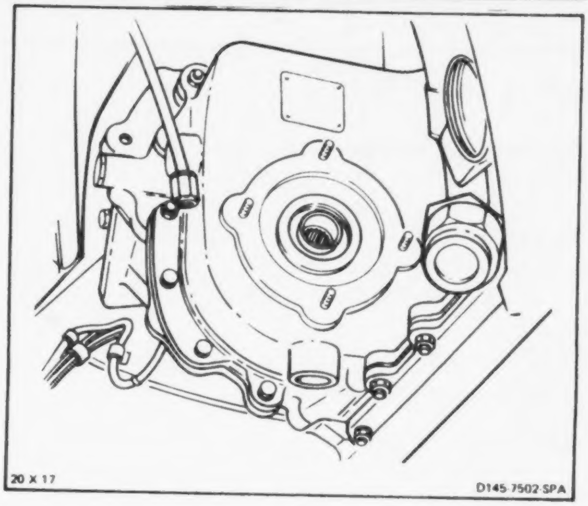
***INSPECT***

FOLLOW-ON MAINTENANCE:

Install flight control hydraulic pump (left side) or utility system hydraulic pump (right side) (Task 7-27 or 7-151).

Close left or right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-86 REMOVE GENERATOR DRIVE SHAFT SEAL FROM AFT TRANSMISSION

INITIAL SETUP

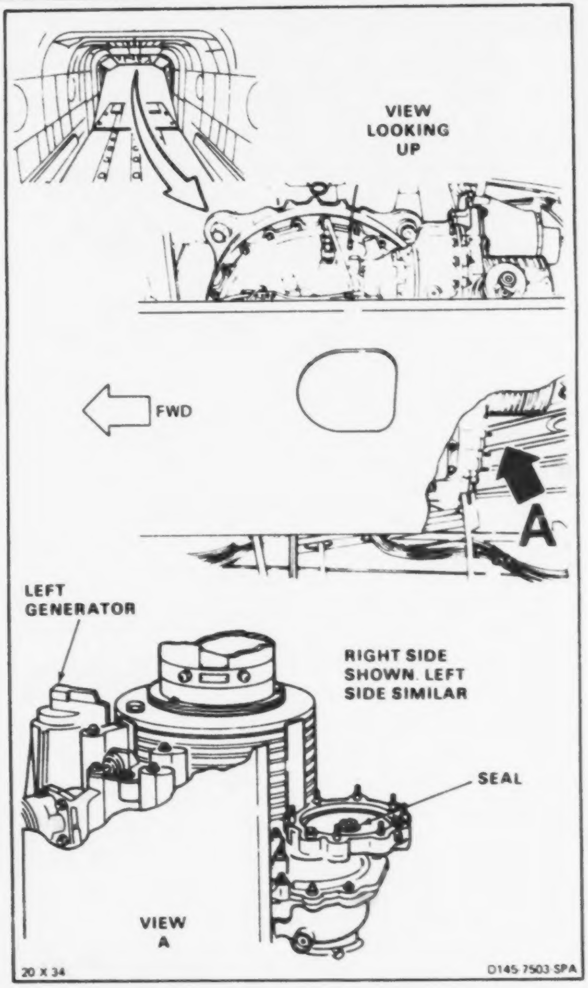
***Applicable Configurations:***
All

***Tools:***
Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Awl
Workstand
Self-Tapping Screw, No. 6 (2)

***Materials:***
Lockwire (E232)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Left or Right Baffle Under Aft Transmission Open (Task 2-2)
Left or Right Generator Removed (Task 9-31)

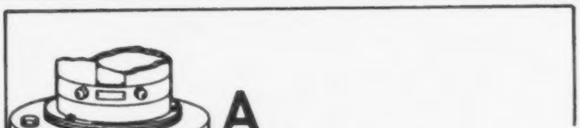

VIEW LOOKING UP
FWD
A
LEFT GENERATOR
RIGHT SIDE SHOWN. LEFT SIDE SIMILAR
SEAL
VIEW A
20 X 34
D145-7503-SPA

---

**NOTE**

Remove generator drive shaft from left or right side of transmission in same way. Right side shown here.

1. **Remove retaining ring (1).**
2. **Punch two holes (2),** 180 degrees apart, in metal casing of seal (3). Use an awl.
3. **Screw a No. 6 self-tapping screw (4) securely in each of two holes (2).** Do not tighten head of screw against seal (3).


A
3
2
4
1
4
VIEW A
20 X 17
D145-7504-SPA

***GO TO NEXT PAGE***

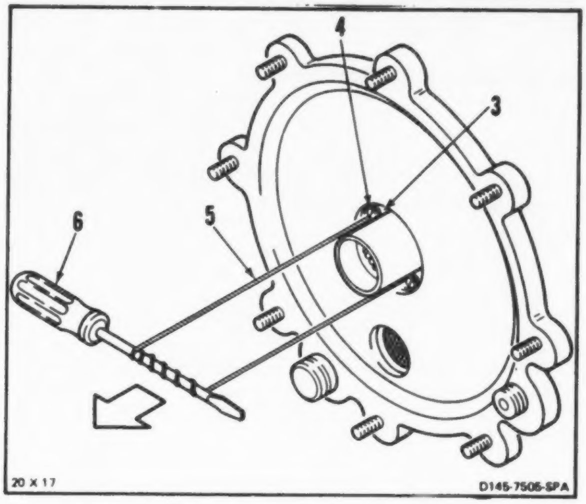
## 6-86 REMOVE GENERATOR DRIVE SHAFT SEAL FROM AFT TRANSMISSION (Continued) 6-86

4. Cut a piece of lockwire (E232) (5) about 24 inches long. **Wrap ends of lockwire under heads of two screws (4).**

**CAUTION**

**Prying against transmission or drive shaft will cause damage.**

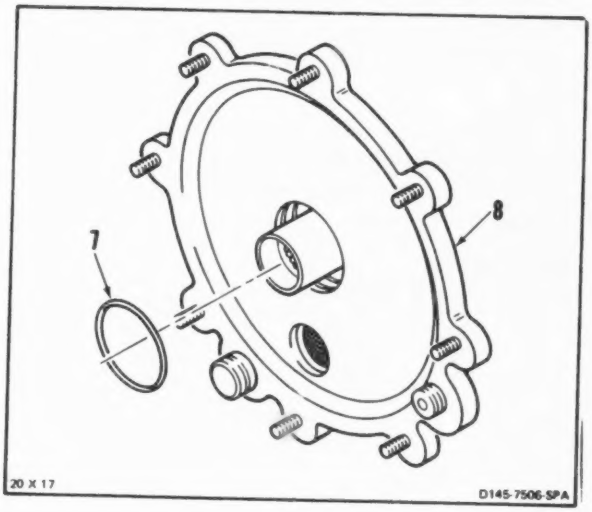
5. **Loop lockwire around a tool (6)**, such as screwdriver or wrench extension. **Remove seal (3)** by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. **Remove packing (7)** from transmission (8).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-87 INSTALL GENERATOR DRIVE SHAFT SEAL ON AFT TRANSMISSION 6-87

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267

Gun Heater

Pyrometer

Aluminum Tube, 2-Inch OD, 1/8-Inch Thick Wall, 1 to 6 Inches Long

Kevlar Gloves (E187)

Workstand

***Materials:***

Gloves (E186)

Dry Cleaning Solvent (E162)

Cloths (E120)

Oil (E254)

***Parts:***

Packing

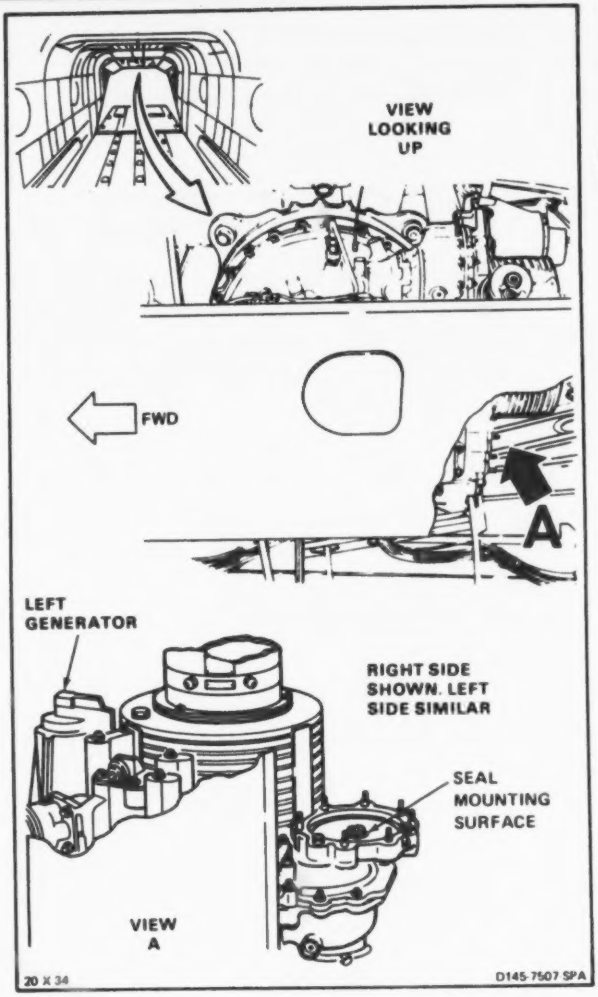
***Personnel Required:***

Aircraft Powertrain Repairer

Inspector

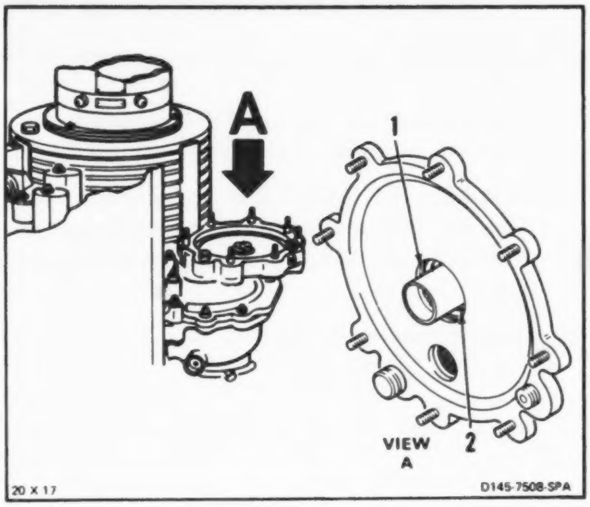
***References:***

TM 55-1520-240-23P


VIEW LOOKING UP
FWD
A
LEFT GENERATOR
RIGHT SIDE SHOWN. LEFT SIDE SIMILAR
SEAL MOUNTING SURFACE
VIEW A
20 X 34
D145-7507 SPA

***GO TO NEXT PAGE***

## 6-87 INSTALL GENERATOR DRIVE SHAFT SEAL ON AFT TRANSMISSION (Continued) 6-87



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**NOTE**

Install generator drive shaft seal on left or right side of transmission in same way. Right side shown here.

1. **Clean seal seating area** of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

**WARNING**

**Wear Kevlar gloves when working around heated area. Hot metal can burn hands.**

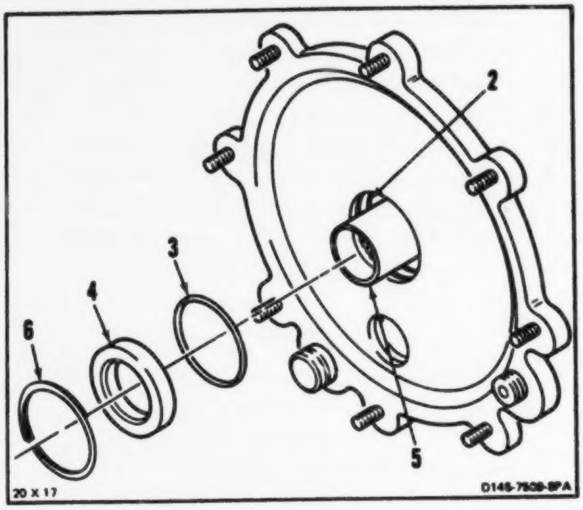
**CAUTION**

**Do not heat transmission over 250°F (120°C). Metal can be damaged.**

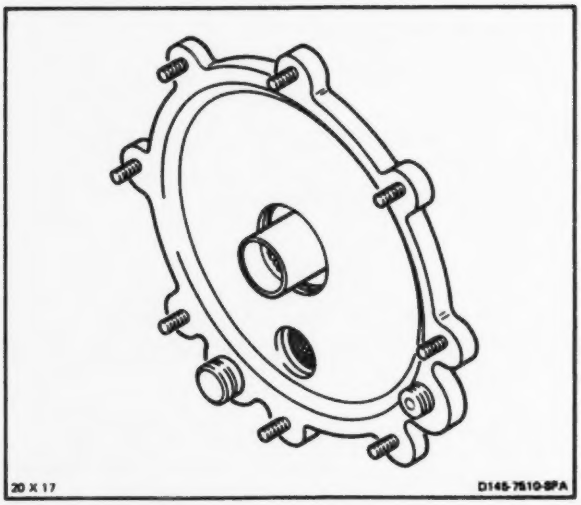
2. **Heat seal seating area (1)** to 230° to 250°F (110° to 120°C). . Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.

*GO TO NEXT PAGE*

## 6-87 INSTALL GENERATOR DRIVE SHAFT SEAL ON AFT TRANSMISSION (Continued) 6-87



3. Coat packing (3) with oil (E254). **Install packing** in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). **Install seal** on drive shaft, seal side out. Use aluminum tube to seat seal.
5. **Install retaining ring (6).**



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install left or right generator (Task 9-32).

Service aft transmission (Task 1-54).

Close left or right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-88 REMOVE AFT TRANSMISSION FAN DRIVE SHAFT SEAL 6-88

INITIAL SETUP

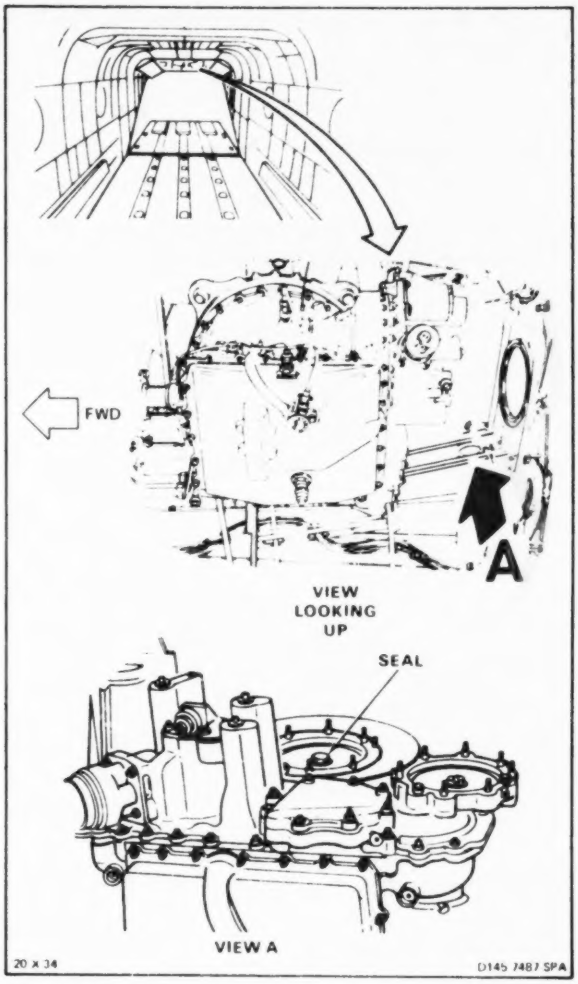
***Applicable Configurations:***
All

***Tools:***
Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Awl
Workstand
Self-Tapping Screw, No. 6 (2)

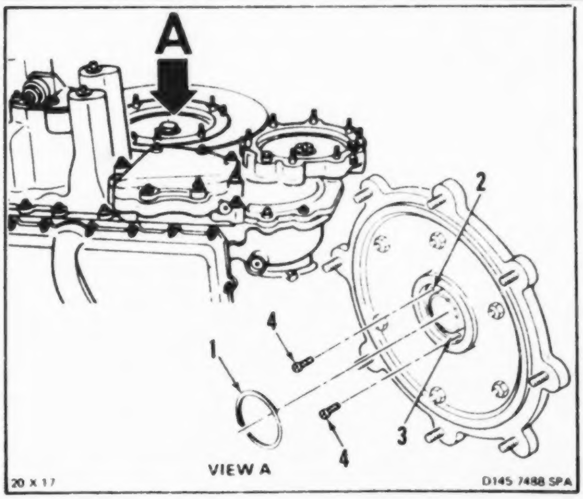
***Materials:***
Lockwire (E232)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Transmission Oil Cooler Removed (Task 6-145)


FWD
A
VIEW LOOKING UP
SEAL
VIEW A
20 x 34
D145 7487 SPA

1. **Remove retaining ring (1).**
2. **Punch two holes (2),** 180 degrees apart, in metal casing of seal (3). Use an awl.
3. **Screw a No. 6 self-tapping screw (4) securely in each of two holes (2).** Do not tighten head of screw against seal (3).


A
2
4
1
3
4
VIEW A
20 x 17
D145 7488 SPA

***GO TO NEXT PAGE***

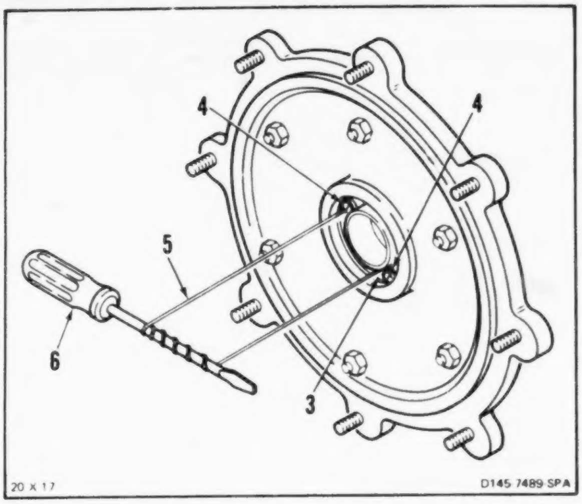
## 6-88 REMOVE AFT TRANSMISSION FAN DRIVE SHAFT SEAL (Continued) 6-88

4. Cut a piece of lockwire (5) about 24 inches long. Use lockwire (E232). **Wrap ends of lockwire under heads of two screws (4).**

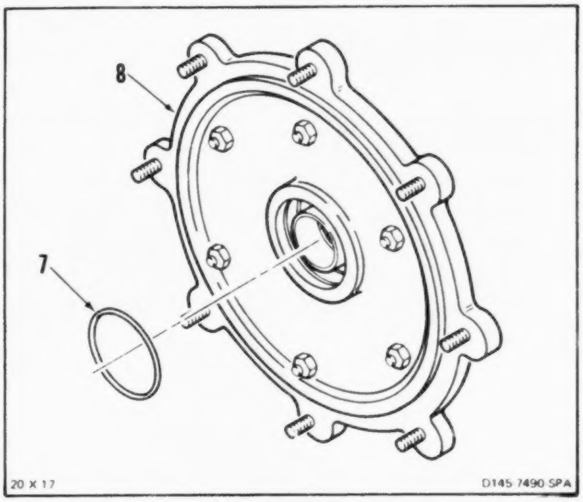
**CAUTION**

**Prying against transmission or drive shaft will cause damage.**

5. **Loop lockwire around a tool (6)**, such as screwdriver or wrench extension. **Remove seal (3)** by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. **Remove packing (7)** from transmission (8).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-89 INSTALL AFT TRANSMISSION FAN DRIVE SHAFT SEAL 6-89

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Aluminum Tube, 2-Inch OD, 1/8-Inch Thick Wall, 1 to 6 Inches Long
Kevlar Gloves (E187)
Workstand

***Materials:***

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

***Parts:***

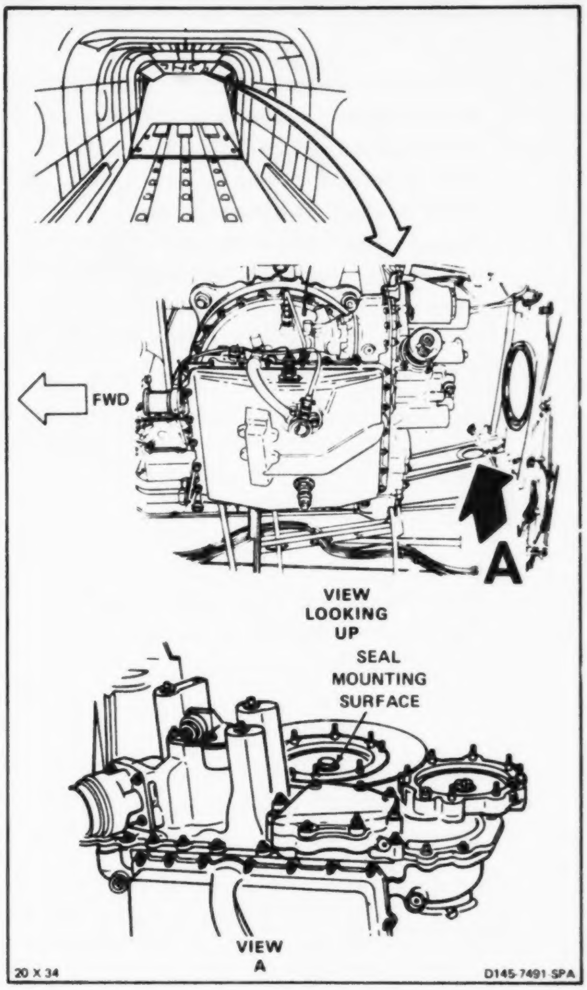
Packing

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

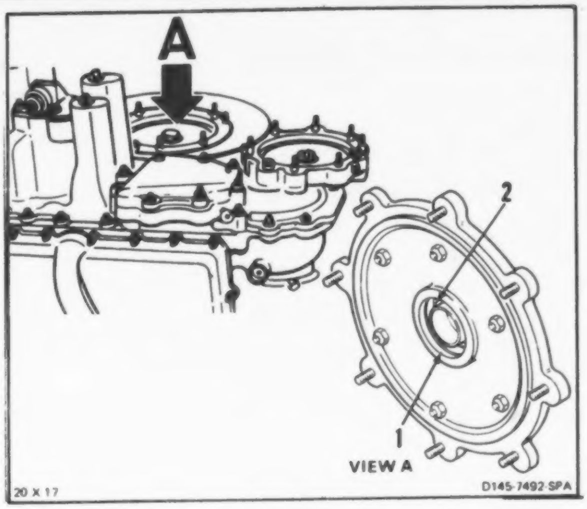
***References:***

TM 55-1520-240-23P


FWD
A
VIEW LOOKING UP
SEAL MOUNTING SURFACE
VIEW A
20 X 34
D145-7491-SPA

***GO TO NEXT PAGE***

## 6-89 INSTALL AFT TRANSMISSION FAN DRIVE SHAFT SEAL (Continued) 6-89



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. **Clean seal seating area** of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.

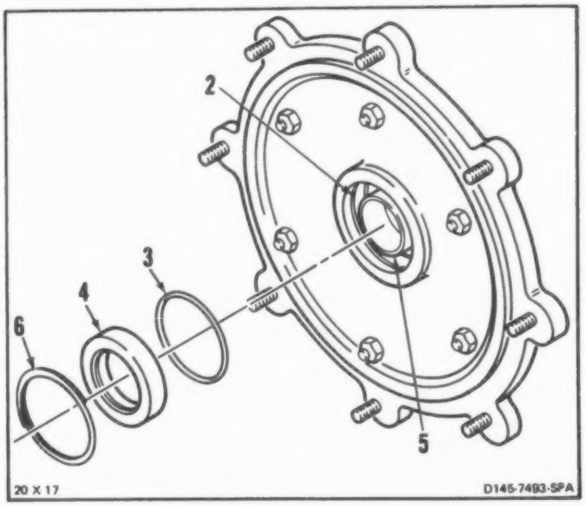
**WARNING**

**Wear Kevlar gloves when working around heated area. Hot metal can burn hands.**

**CAUTION**

**Do not heat transmission over 250°F (120°C). Metal can be damaged.**

2. **Heat seal seating area (1)** to 230° to 250°F (110° to 120°C). Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.



3. Coat packing (3) with oil (E254). **Install packing** in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). **Install seal** on drive shaft, seal side out. Use aluminum tube to seat seal.
5. **Install retaining ring (6).**

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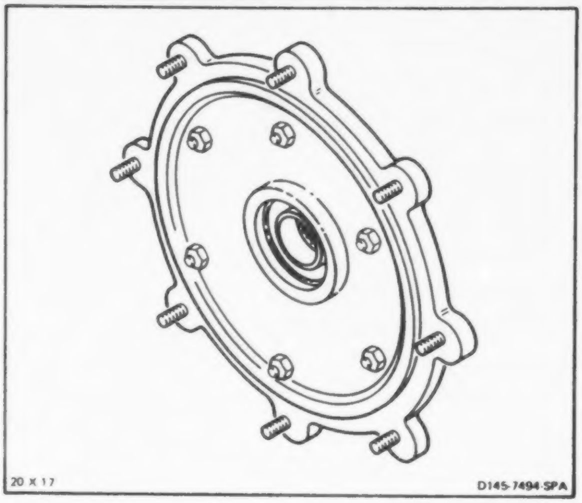
## 6-89 INSTALL AFT TRANSMISSION FAN DRIVE SHAFT SEAL (Continued) 6-89



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install aft transmission oil cooler (Task 6-146).

Service aft transmission (Task 1-54).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

**END OF TASK**

## 6-90 REMOVE AFT TRANSMISSION ROTOR SHAFT SEAL 6-90

INITIAL SETUP

***Applicable Configurations:***
All

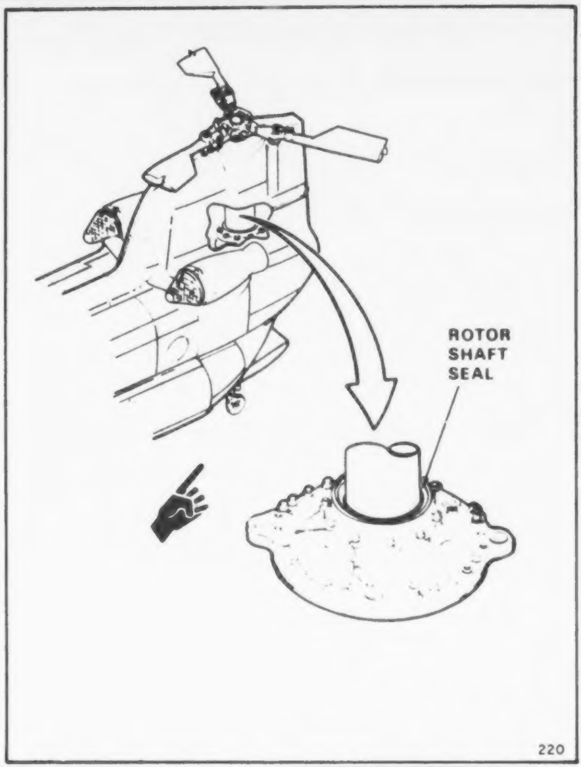
***Tools:***
Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Hoist Kit (T3)

***Materials:***
Barrier Material (E81)
Tape (E388)

***Personnel Required:***
Aircraft Powertrain Repairer

***References:***
Task 6-92

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



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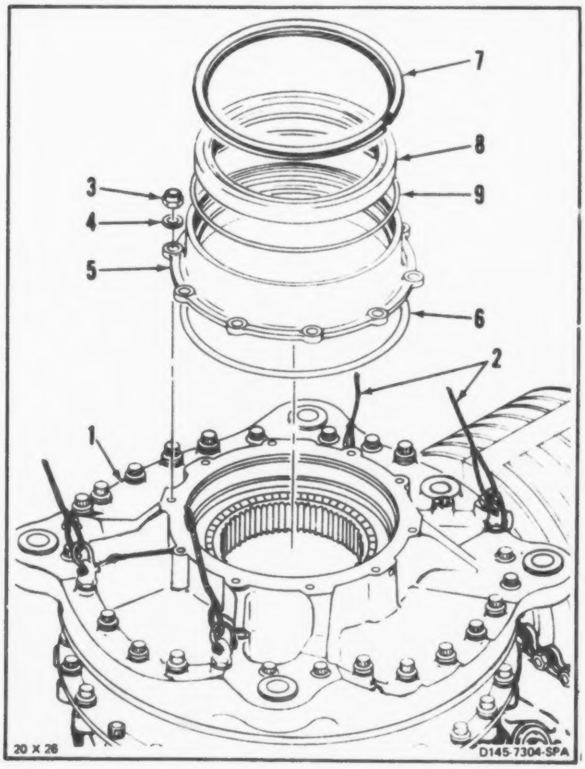
1. **Lower aft transmission (1)** into cabin with hoist kit (T3) (Task 6-92, steps 1 thru 31). Keep tension on four cables (2).
2. **Remove 10 nuts (3)** and washers (4) from seal retainer (5).
3. **Remove seal retainer (5)** and packing (6).
4. Cover opening into transmission (1). Use barrier material (E81) and tape (E388).
5. Remove retaining ring (7) from seal retainer (5).
6. **Remove seal (8)** and packing (9).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-91 INSTALL AFT TRANSMISSION ROTOR SHAFT SEAL 6-91

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
Gun Heater
Pyrometer
Kevlar Gloves (E187)
Wood Plank, 2 Inches x 4 Inches x 12 Inches
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***

Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Gloves (E186)

***Parts:***

Packings

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

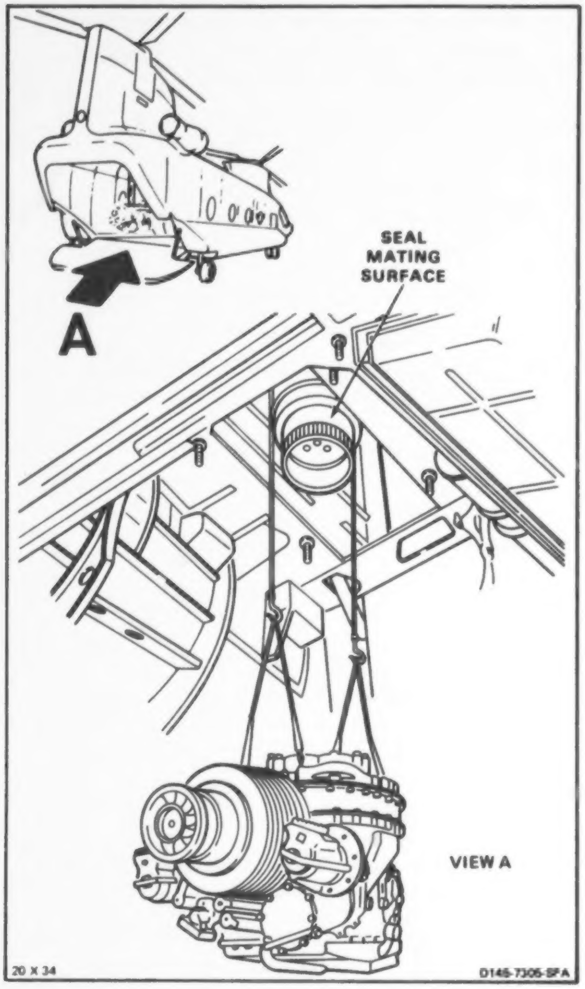
***References:***

TM 55-1520-240-23P
Task 6-97

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes . Get medical attention for eyes.**



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## 6-91 INSTALL AFT TRANSMISSION ROTOR SHAFT SEAL (Continued) 6-91

1. **Clean seal retainer (1).** Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

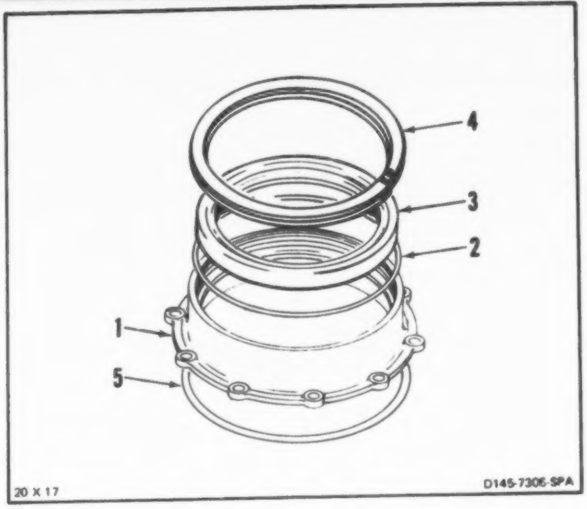
**WARNING**

**Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.**

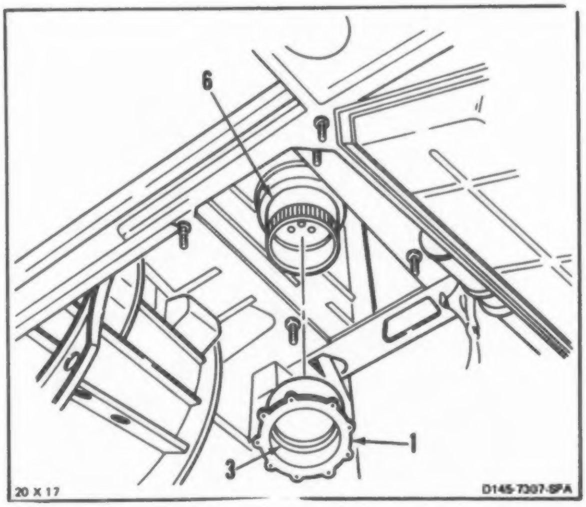
**CAUTION**

**Do not heat retainer over 250°F (120°C). Metal can be damaged.**

2. **Heat retainer (1)** to 230° to 250°F (110°to 120°C. Use gun-type heater and pyrometer. Wear gloves (E187).
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use wood plank and mallet to seat seal.
5. Install retaining ring (4).
6. **Install packing (5)** on bottom of retainer (1).



7. Coat lip of seal (3) and mating surface of rotor shaft (6) with oil (E254).
8. **Install seal retainer (1)** on rotor shaft (6). Be careful not to damage seal.



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## 6-91 INSTALL AFT TRANSMISSION ROTOR SHAFT SEAL (Continued) 6-91

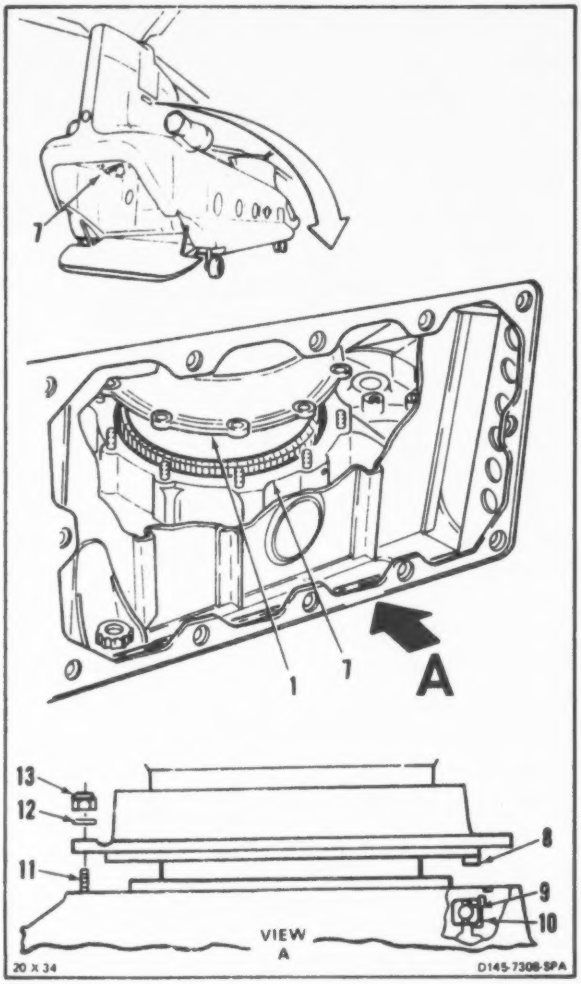
9. Remove tape and barrier material from aft transmission (7). **Install aft transmission** (Task 6-97).

**NOTE**

Reach seal retainer through open aft transmission access doors on each side of aft pylon.

10. Align tab (8) on seal retainer (1) with slot (9) in outer race of bearing (10) in aft transmission (7). **Install seal retainer** on 10 studs (11).
11. **Install 10** washers (11) and **nuts (12). Torque nuts to 60 inch-pounds.**

***INSPECT***



FOLLOW-ON MAINTENANCE:

Perform ground run (TM 55-1520-240-10).

Install transmission access doors on aft pylon (both sides) (Task 2-2).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

20 X 17
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**END OF TASK**

## 6-92 REMOVE AFT TRANSMISSION 6-92

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Aft Rotor Shaft Securing Device (T50)
Hoist Kit (T85)
Handling Sling (T163) (Used with (T85) as Alternate Sling)
Socket, 1 5/16-Inch
Aft Transmission Torque Adapter (T160)
Torque Pack (T23)
Tee Handle (T161)
Aft Transmission Adapter (T17)
Transportation Trailer 2000
Roller Adapter 2550 (4)
Workstand (2)

***Materials:***

Twine (E433)
Barrier Material (E80)
Masking Tape (E388)
Paper Tags (E264)

***Personnel Required:***

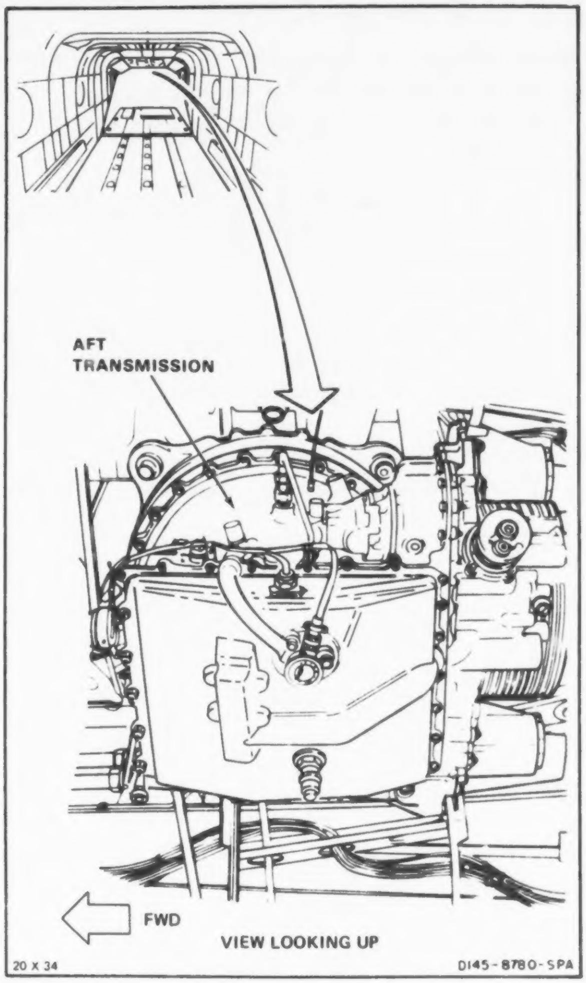
Medium Helicopter Repairer (5)

***References:***

TM 55-1520-240-T
Task 2-2

***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Pylon Access Doors to Generators and Transmission Removed (Both Sides) (Task 2-2)
No. 9 Aft Drive Shaft Removed (Task 6-21)
Aft Transmission Adapter Assembly Removed (Task 6-23)
Aft Rotor Pitch Links Disconnected (Task 5-97)
Aft Servocylinder Safety Blocks Installed (Task 11-28)



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## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

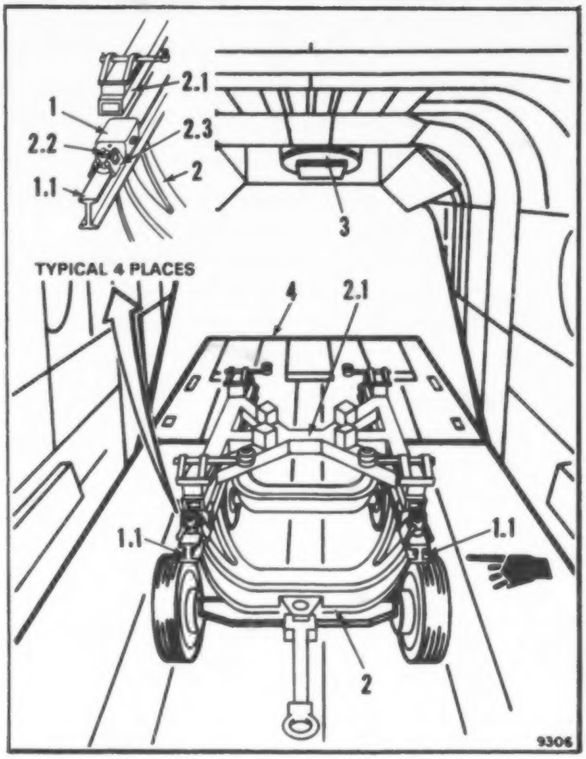
1. **Fit four roller adapters (1)** over two rails (1.1) of trailer (2).

   1.1 With aid of helper, **position adapter (2.1) on roller adapters (1).**

   1.2 **Turn fitting (2.2)** of each roller adapter (1) clockwise **until clamp (2.3) fits tightly** against rail (1.1).

2. **Position trailer (2) in cabin** forward of aft transmission (3).

3. Raise cargo ramp (4) to level (TM 55-1520-240-T).



### *INSTALL AFT ROTOR SHAFT SECURING DEVICE*

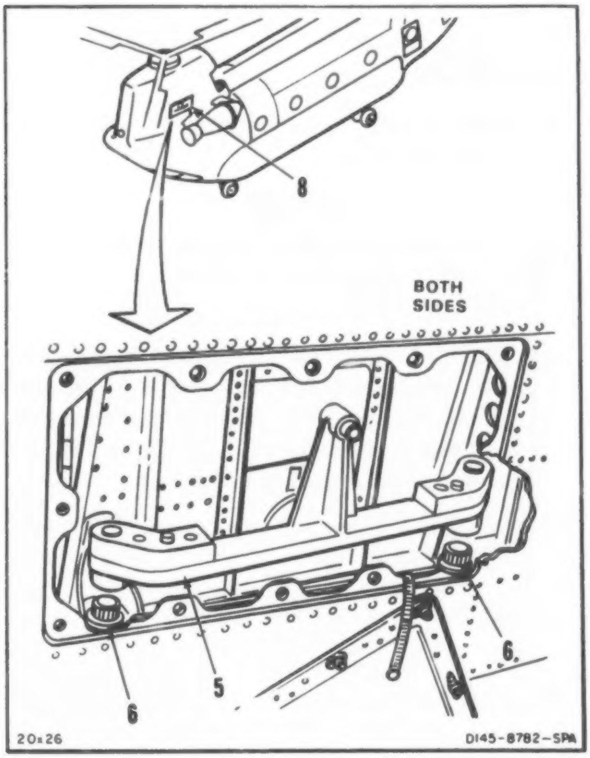
**CAUTION**

**Do not turn rotor blades while securing device is installed. Rotor shaft can be damaged.**

**NOTE**

- Install securing device with aid of helper through transmission access holes in pylon.
- Adapter bars are marked LEFT SIDE and RIGHT SIDE. They are not interchangeable.

4. **Install two adapter bars (5)** on transmission mounting nuts (6) at each side of rotor shaft (7). Work through access hole (8) at each side of helicopter.



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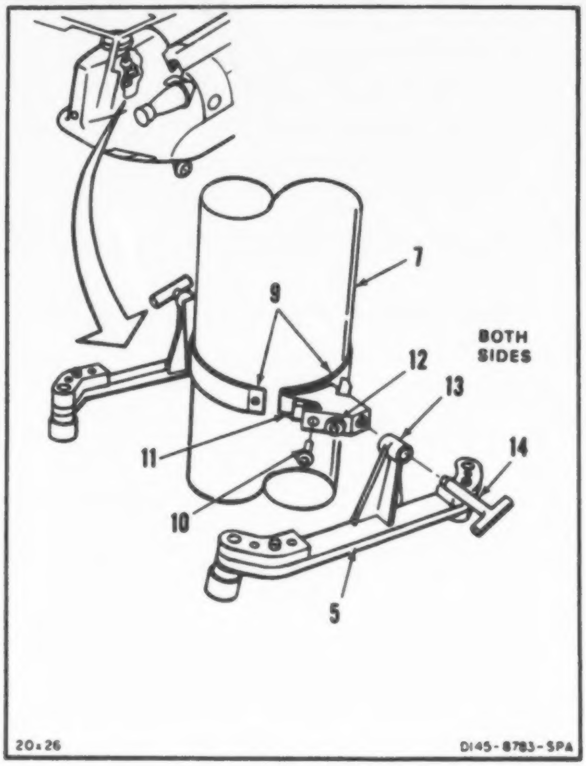
## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

5. **Install two clamps (9)** around rotor shaft (7). Secure them to each other with pins (10) through plates (11).
6. With aid of helper, **loosely secure clamps (9) to shaft (7)** by tightening two knobs (12). Slide clamp assemblies down shaft to align with uprights (13) on two adapter bars (5). Install pins (14) through uprights and plates (11).
7. **Tighten clamps (9)** around shaft (7) with two knobs (12).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BOTH SIDES
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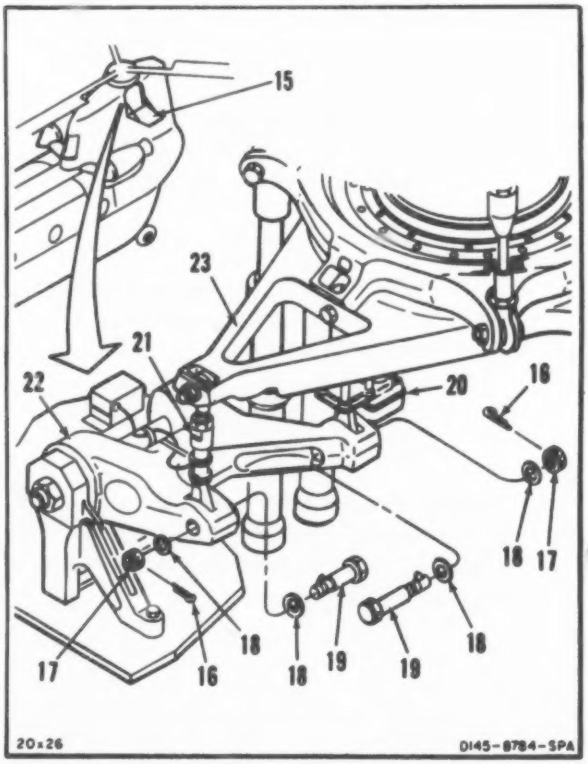
*INSTALL HOIST KIT*

8. Open aft pylon left and right work platforms (15) (Task 2-2).

**NOTE**

Yoke must be disconnected for forward hoist and beam assembly clearance.

9. Remove cotter pins (16), nuts (17), washers (18), and bolts (19) from lower end of actuator (20) and link (21). **Disconnect actuator and link from yoke (22). Remove actuator from swashplate yoke (23).**
10. Tie yoke (22) to swashplate yoke (23). Use twine (E433).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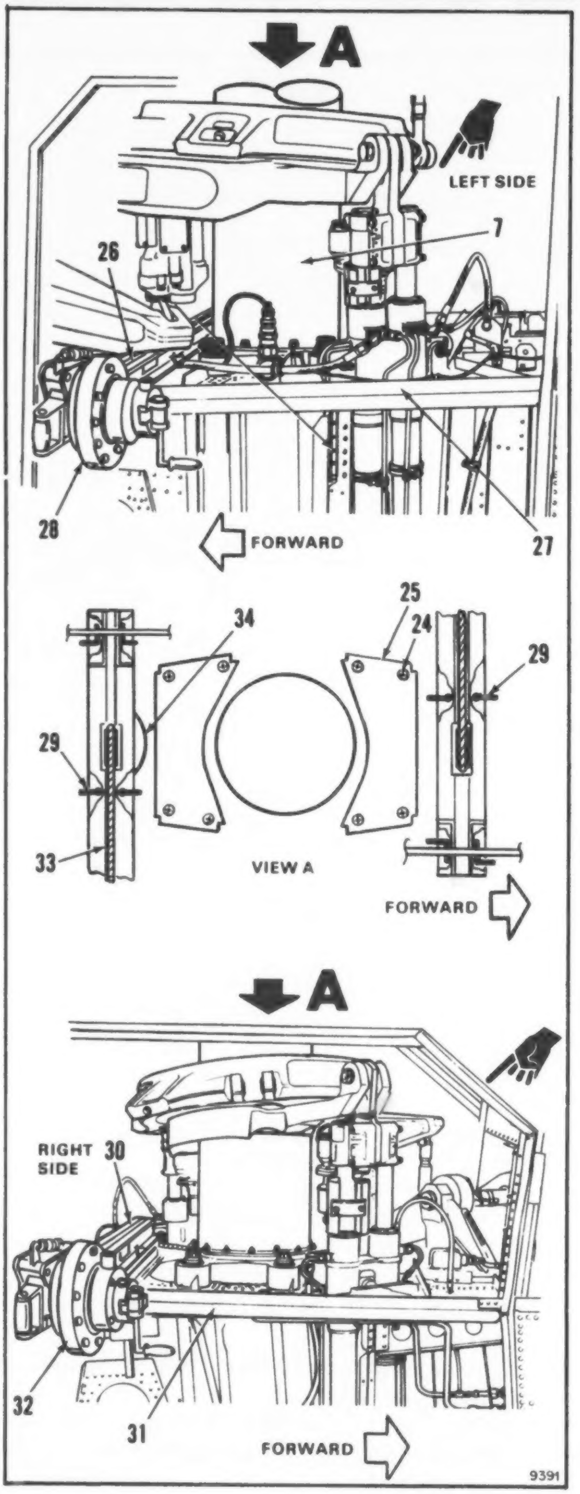
## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

11. Release four fasteners (24) on plate (25). Remove plate.
12. **Install beam assembly (26)** on aft pylon structure (27) forward of rotor shaft (7), with hoist (28) at left. Install four pins (29) through beam and structure.
13. **Install beam assembly (30)** on aft pylon structure (31) aft of rotor shaft (7), with hoist (32) at right. Install four pins (29) through beam and structure. Lower cable (33) through hole (34).
14. With aid of helper, operate two hoists (28 and 32) to **lower cables (33) to top of transmission (3).**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FORWARD
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RIGHT SIDE
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31
FORWARD
9391

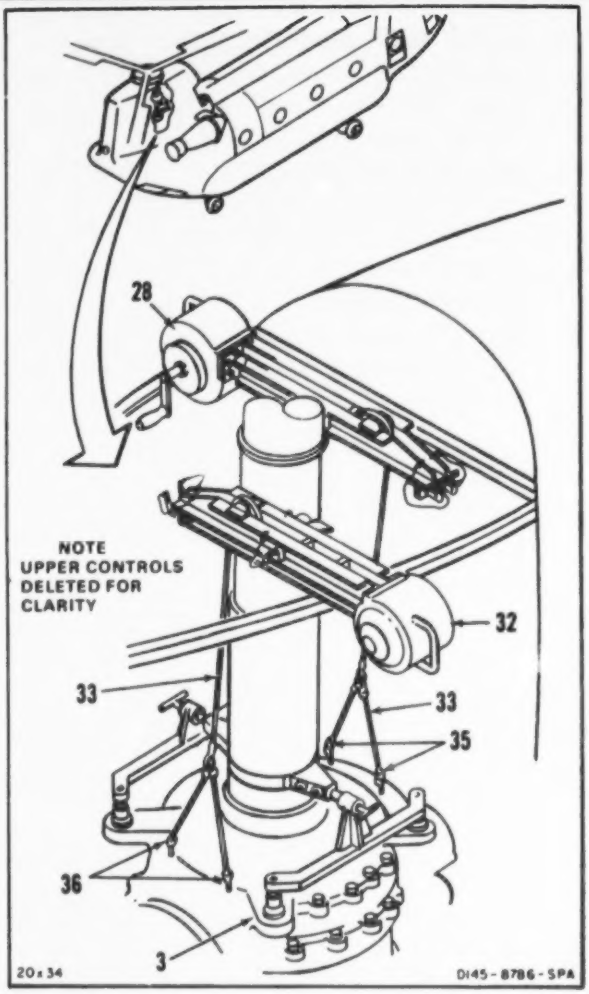
*GO TO NEXT PAGE*

## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

**NOTE**

Reach forward hoist eyes from cabin. Reach aft hoist eyes from generator access holes on each side of pylon.

15. **Connect cables (33)** of forward hoist (28) to two forward hoist eyes (35) on transmission (3). Connect cables of aft hoist (32) to two aft hoist eyes (36) on transmission.
16. Operate hoists (28 and 32) to **remove slack from cables (33).** Do not apply tension.


28
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D145-8786-SPA

### *DISCONNECT TRANSMISSION*

**NOTE**

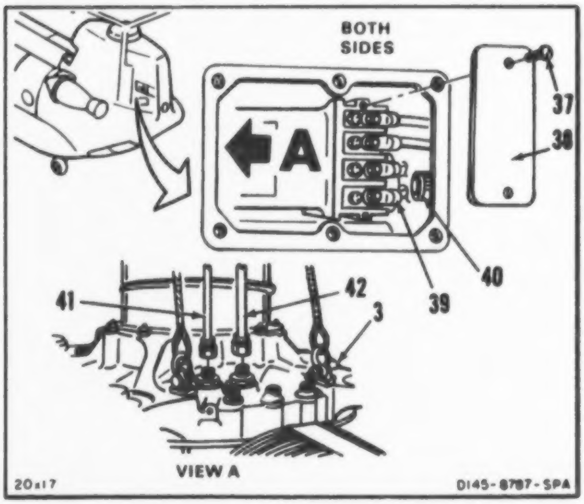
Disconnect wires from two generators in same way. Reach generator connections through access holes on each side of pylon.

17. Remove two screws (37) from cover plate (38). Remove plate.
18. Tag and **disconnect four wires (39) and connector (40).**

**NOTE**

Reach oil hoses through generator access holes.

19. **Disconnect two oil hoses (41 and 42)** from top of transmission (3).


BOTH
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VIEW A
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D145-8787-SPA

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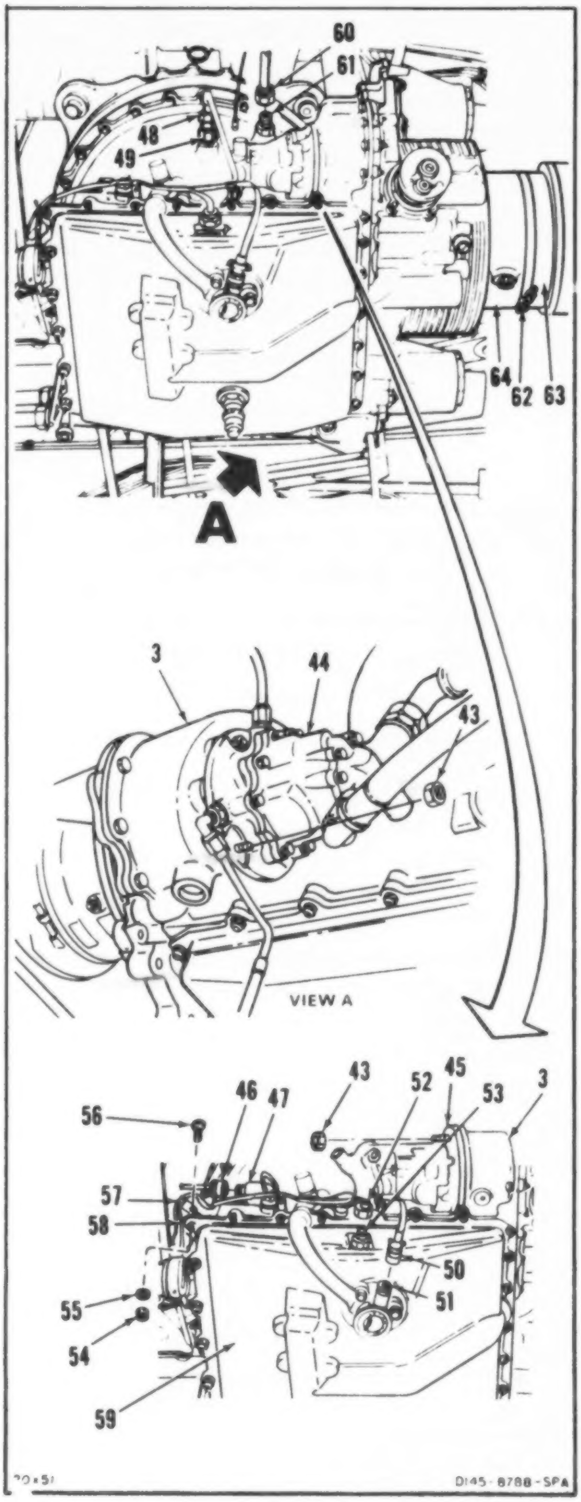
## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

**CAUTION**

**Do not kink hoses when handling pumps.**

20. Remove four nuts (43) from two hydraulic pumps (44 and 45). **Remove pumps from transmission (3).** Tie pumps to each side of cabin with twine (E433).
21. Tag and **disconnect electrical connector (46)** from auxiliary oil pressure switch (47). Tag and **disconnect electrical connector (48)** from main oil pressure switch (49).
22. Tag and **disconnect electrical connector (50)** from indicating screen and chip detector (51). Tag and **disconnect electrical connector (52)** from temperature bulb (53).
23. Remove nuts (54), washers (55), and screws (56) from four clamps (57). **Tie wires (58) away from sump (59).**
24. **Disconnect oil hose (60)** from adapter (61).
25. **Loosen clamp (62)** at duct (63). **Slide clamp and duct aft,** away from oil cooler fan (64).



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## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

***REMOVE NUTS***

**NOTE**

Torque shaft and torque adapter are part of torque adapter assembly (T160).

26. **Install torque adapter (65)** between structure (66) at sta 534 and structure (67) at sta 594. Flat side of base (68) shall face aft. Center adapter under transmission (3) and tighten four hand knobs (69).

**WARNING**

**Make sure ratchet selector on torque pack is set to NUT OFF before applying torque. Changing ratchet settings with torque applied can damage unit and cause injury to personnel.**

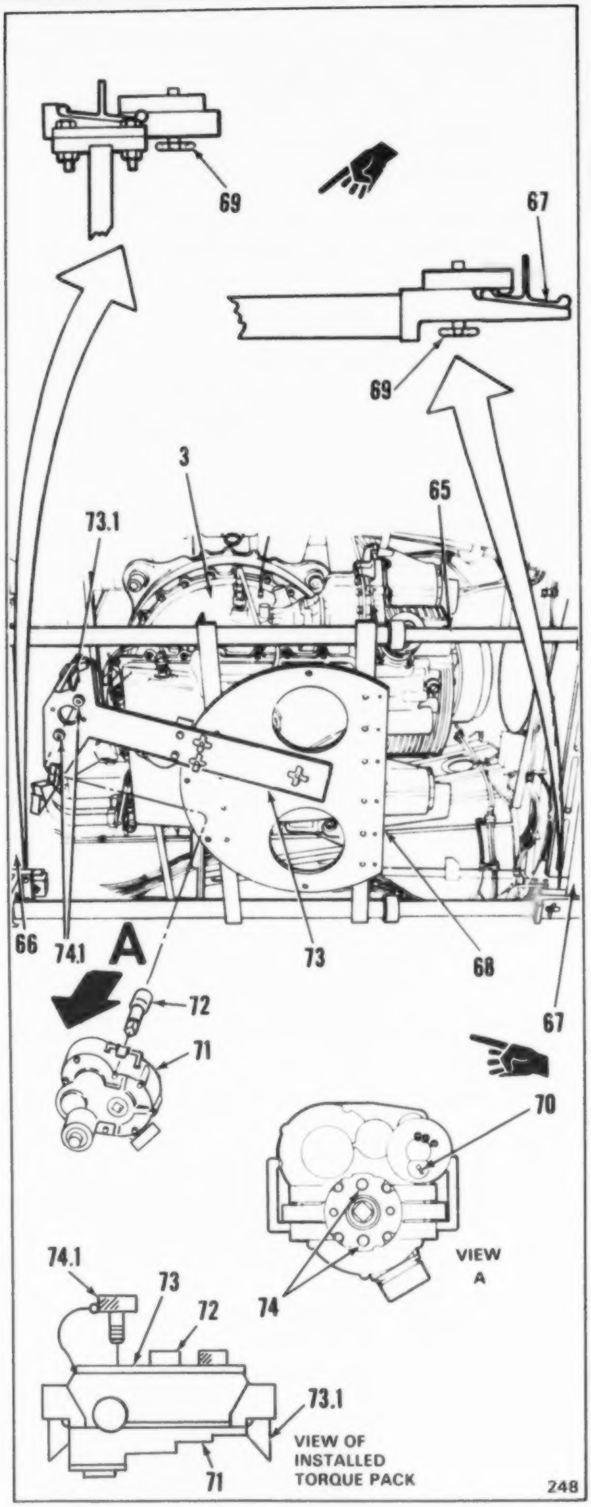
27. **Set ratchet selector (70) on torque pack (T23) (71) to NUT OFF.**

**NOTE**

Adapter is part of torque pack (T23).

28. **Install adapter (72)** in torque pack (T23) (71). **Install torque pack** on support (73) with two hooks (73.1). Make sure two pins (74) on bottom of torque pack engage holes in support.

28.1. **Secure torque pack (71) to support (73).** Use two thumb screws (74.1).



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## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

29. **Loosen** each of four transmission **mounting nuts (75)** as follows:

**NOTE**

Removal of forward left nut shown here.

a. Loosen knob (75.1).

b. If loosening a forward nut (75), position support (73) directly under nut to be loosened. If loosening an aft nut, position support straight out to side of nut to be loosened. Install and tighten two knob assemblies (76) through support and base plate (68).

c. Tighten knob (75.1).

**NOTE**

Torque shaft is spring-loaded and compresses for installation.

d. **Place one end of torque shaft (77)** on nut (75). Place other end on adapter shaft (72).

**WARNING**

**Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

e. Set selector switch on tee handle (T161) (78) to OFF. Install tee handle on torque pack (T23) (71). Turn handle counterclockwise until torque is broken.

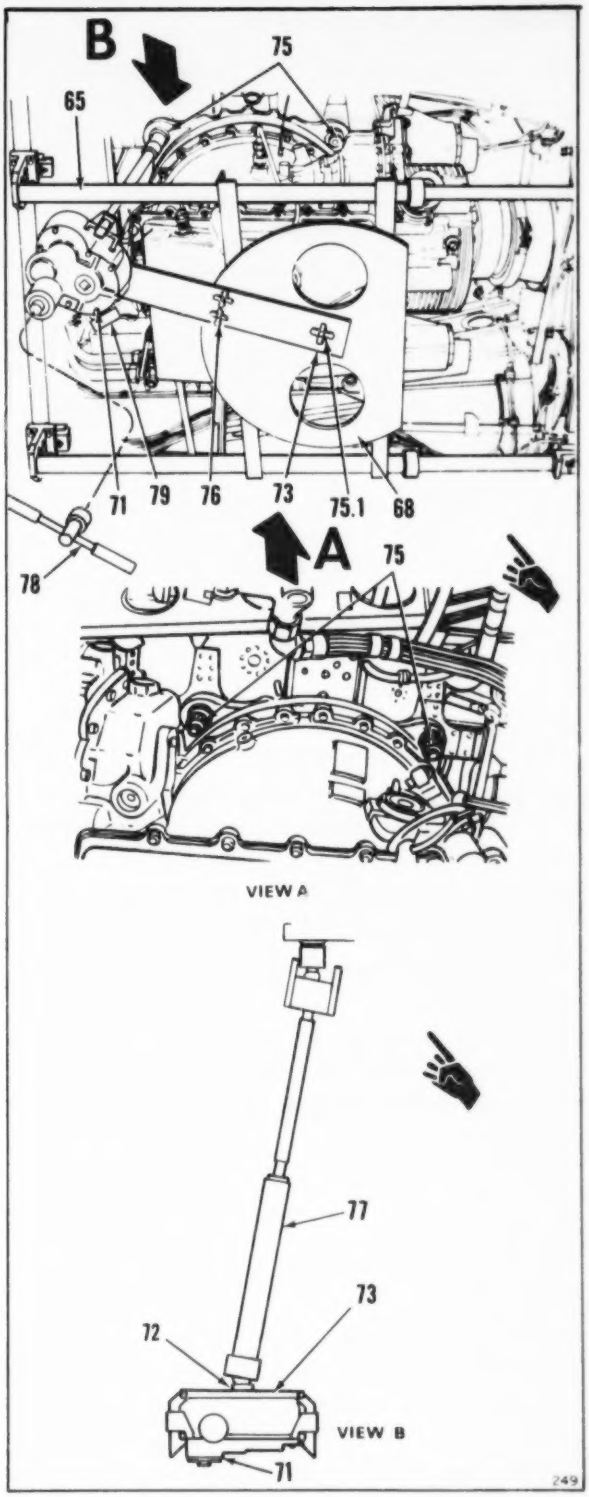
f. Set selector switch on tee handle (78) to ON. Turn handle clockwise until torque indicator reads 0 and torque pack (71) is loose.

g. Remove torque shaft (77).

29.1. Loosen thumb screws (74.1) and release hooks (73.1). Remove torque pack (71) from support (73).

29.2. Remove torque adapter (65) from helicopter structure.

29.3. Remove four nuts (75).



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## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

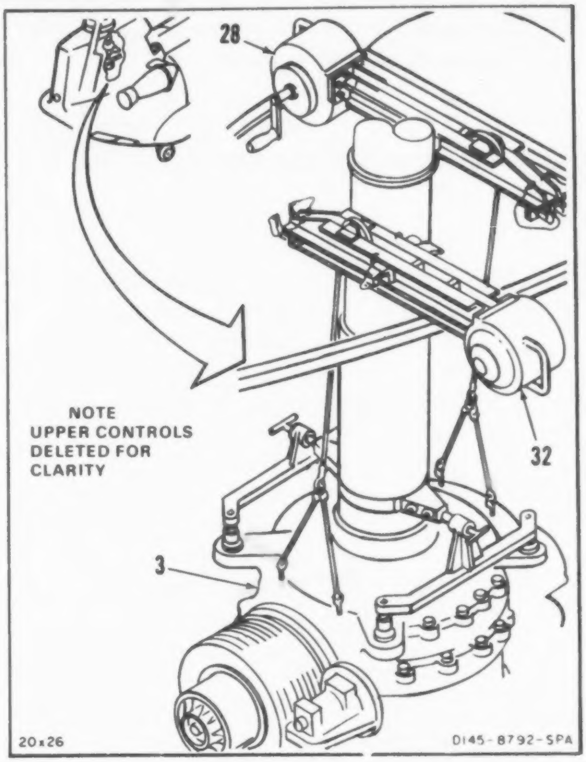
### *REMOVE TRANSMISSION*

30. Station helpers in cabin to guide transmission (3).

CAUTION

**If transmission is not kept tilted forward 4 degrees , rotor shaft splines can bind within transmission. Damage can result.**

31. Have helpers operate two hoists (28 and 32) to slowly **lower transmission (3). Keep transmission tilted forward 4 degrees** during lowering.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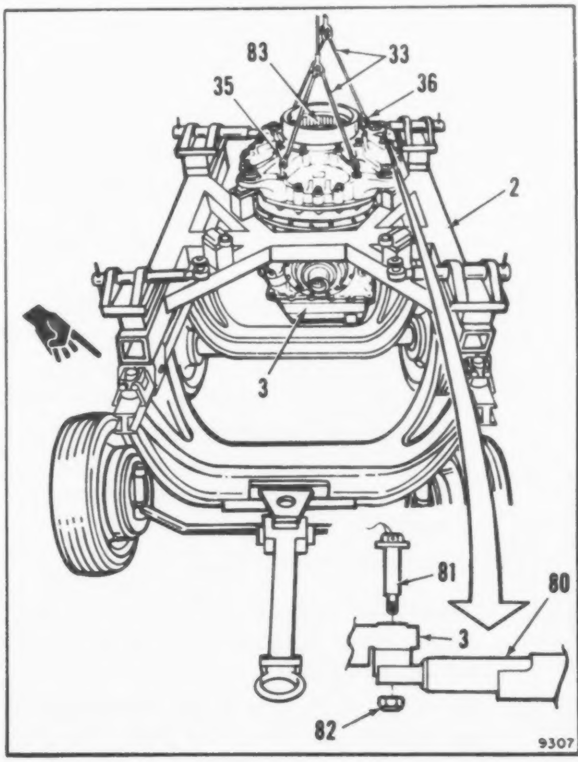
32. Slide back two mount arms (80) on adapter (2). **Lower transmission (3) on adapter.** Extend two arms.
33. Install four bolts (81) in transmission (3) and adapter. Install nuts (82).
34. Disconnect cables (33) from hoist eyes (35 and 36).
35. Cover transmission cavity (83) with barrier material (E80) and tape (E388).
36. **Remove transmission (3)** from helicopter.


83
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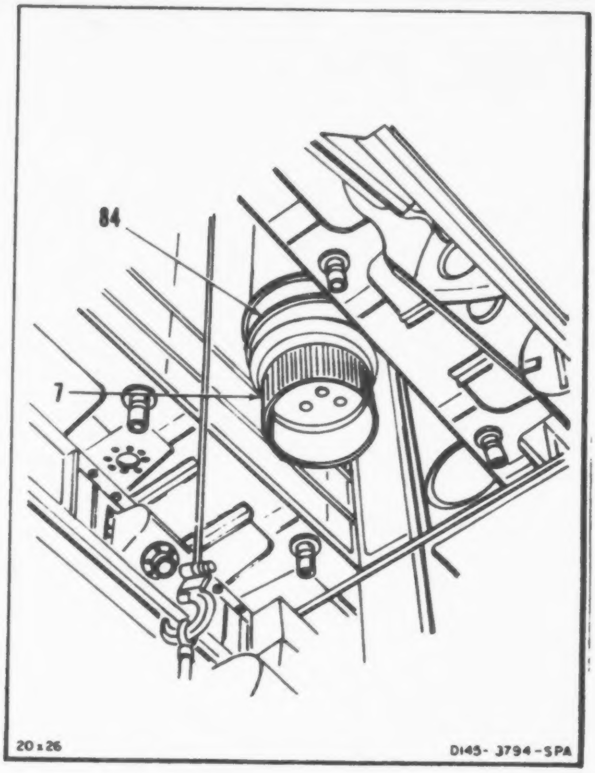
## 6-92 REMOVE AFT TRANSMISSION (Continued) 6-92

37. **Cover splines (84)** of rotor shaft (7) with barrier material (E80) and tape (E388).

FOLLOW-ON MAINTENANCE:

None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**END OF TASK**

## 6-93 DISASSEMBLE (TEAR DOWN) AFT TRANSMISSION 6-93

INITIAL SETUP

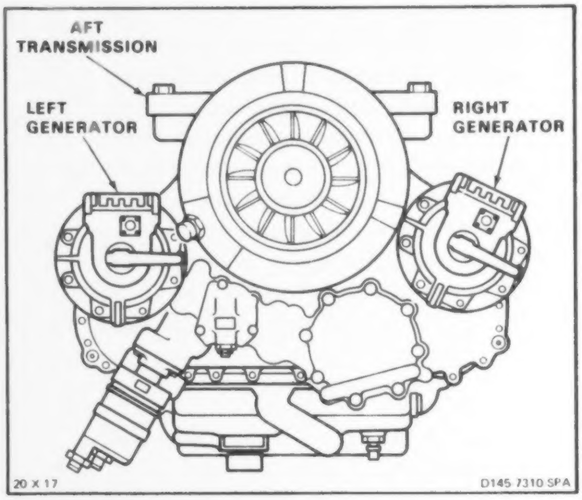
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Barrier Material (E81)
Tape (E388)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Off Helicopter Task


AFT TRANSMISSION
LEFT GENERATOR
RIGHT GENERATOR
20 X 17
D145-7310-SPA

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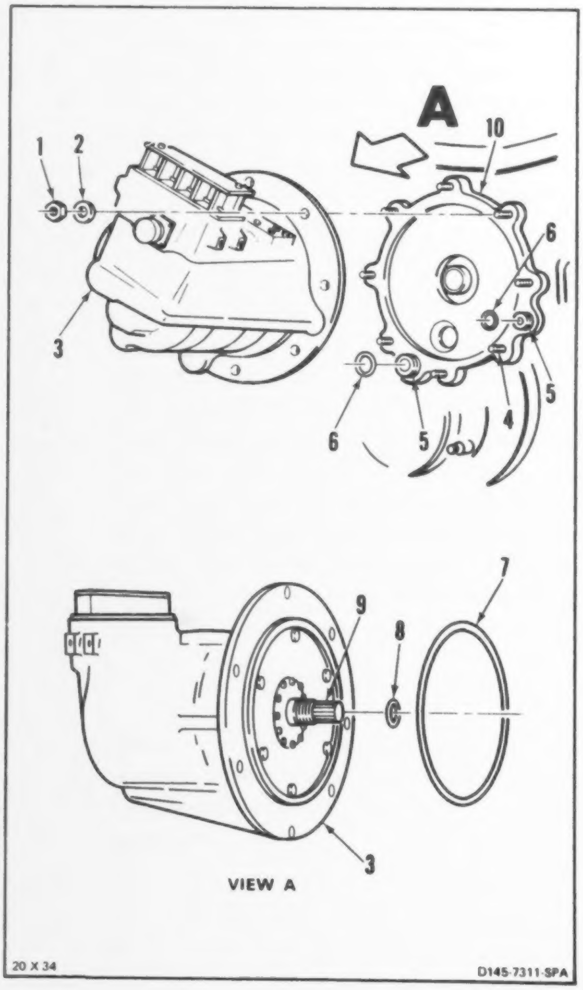
**NOTE**

Remove left and right generator from aft transmission in same way. Right generator shown here.

1. **Remove eight nuts (1)** and washers (2) from generator (3).
2. Pull generator (3) from eight studs (4) and two transfer tubes (5). **Remove generator.**
3. Remove packings (6) from two oil transfer tubes (5). Remove packing (7) from generator (3). Remove packing (8) from generator drive shaft (9).
4. Cover mounting pad (10), including two transfer tubes (5), with barrier material (E81) and tape (E388).
5. Repeat steps 1 thru 4 for left generator.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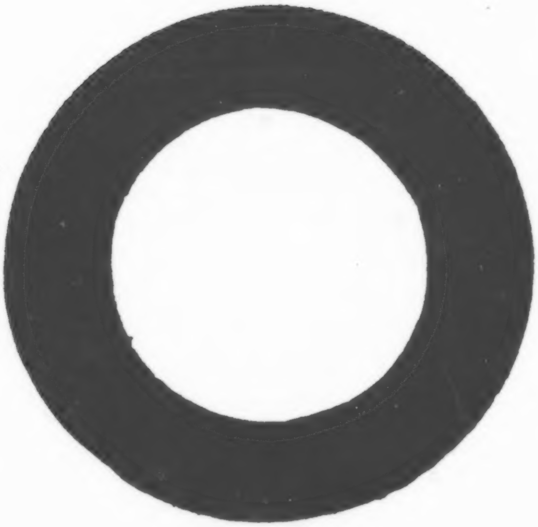
FOLLOW-ON MAINTENANCE:

None

**END OF TASK**



## 6-93.1 REPAIR AFT TRANSMISSION OUTSIDE SURFACE 6-93.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Dial Indicating Depth Gage 643J
Goggles

***Materials:***

Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1500-323-23
MIL-C-5541
MIL-M-3171, Type VI
MIL-C-22751

***Equipment Condition:***

Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.**

*GO TO NEXT PAGE*

## 6-93.1 REPAIR AFT TRANSMISSION OUTSIDE SURFACE (Continued)

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cover (1) and housing (2).

**NOTE**

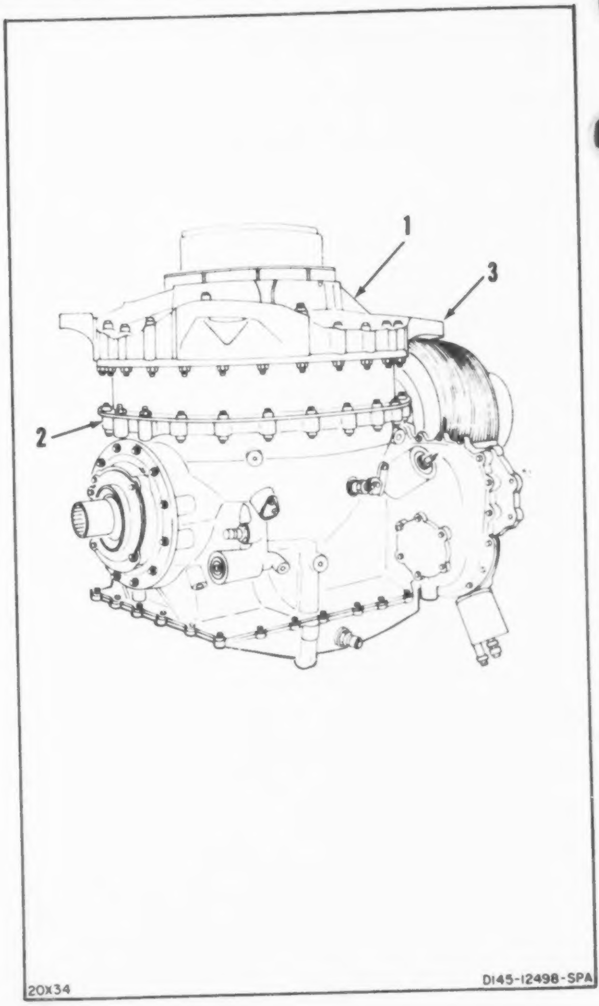
Refer to Task 6-35 for repairs to sump.

**NOTE**

Limits in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**
   b. **Damage shall not extend over more than one surface or enter any radius.**
   c. **Damage shall not be closer than 1.00 inch to any mounting hole (3).**

3. **Fluorescent inspect** damaged area to check for cracks (TM 55-1500-323-23). **There shall be no cracks.**
4. Cover moving parts near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.



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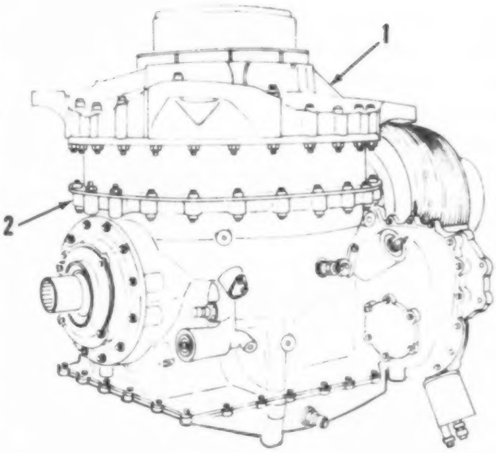
## 6-93.1 REPAIR AFT TRANSMISSION OUTSIDE SURFACE (Continued) 6-93.1

6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid etch reworked area** as follows:
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.
   b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 55-1500-323-23). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths. Wear gloves (E186). Let area air dry.
   b. **If area is on cover (1), swab solution of alodine powder (E65) in water on area (MIL-C-5541). Swab for 2 to 5 minutes.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry. Wear gloves (E186).
   c. **If area is on housing (2), swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, Type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry. Wear gloves (E186).
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours. Wear gloves (E186).
11. **Apply epoxy topcoat (E166)** (MIL-C-22751). Wear gloves (E186).



DI45-12499-SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-94 PREPARE AFT TRANSMISSION FOR SHIPMENT OR STORAGE

INITIAL SETUP

***Applicable Configurations:***
All

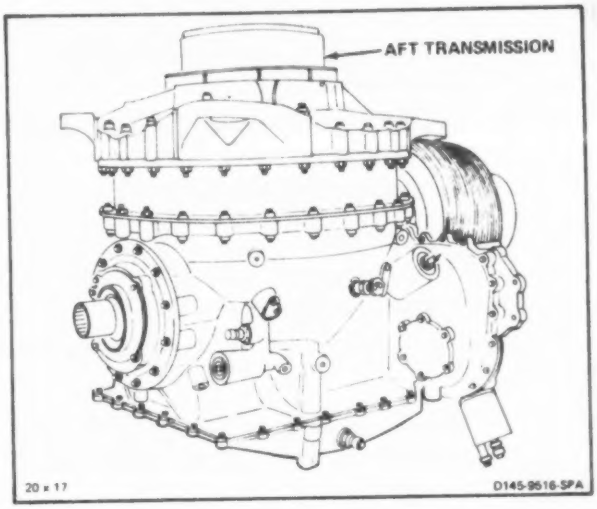
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Sling 114E5119-2 (p/o T3)
Work Hoist
Shipping Container (T37)
Container, 14-Quart (3)
Torque Wrench, 0 to 500 Foot-Pounds

***Materials:***
Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Barrier Material (E81)
Masking Tape (E388)
Desiccant (E160), 16-Unit Bag (5)
Tarpaulin (E410) or Plastic Sheet (E279)

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***References:***
TB 55-8100-200-25
TM 38-750
TB 750-126

***Equipment Condition:***
Off Helicopter Task
Aft Transmission Disassembled (Task 6-93)



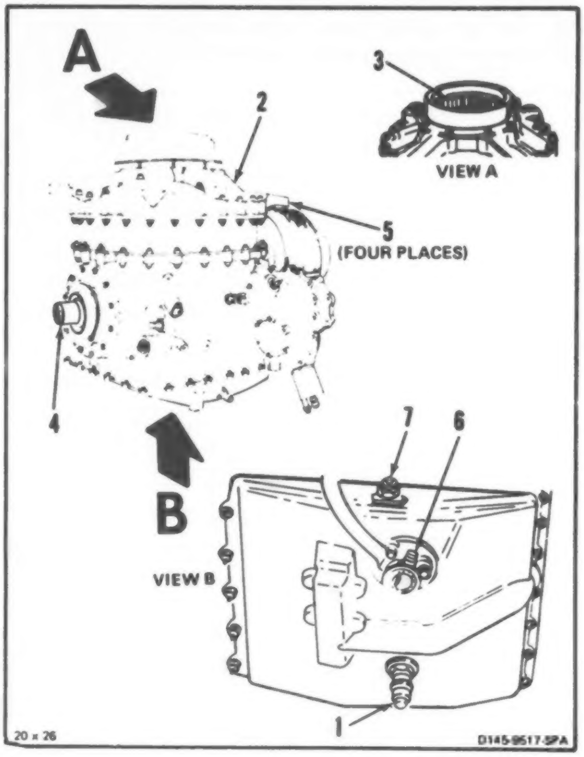
***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

GO TO NEXT PAGE

## 6-94 PREPARE AFT TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-94



### NOTE

Sump holds about 30 quarts of oil.

1. Push in drain valve (1), twist it, and pull. **Let oil drain** into containers. Push in valve, twist it, and pull down to close.
2. Clean all surfaces of transmission (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
3. **Clean** rotor shaft **splines (3)**, input shaft **splines (4) and four bushings (5).** Use fingerprint remover (E175) and clean cloths (E120).

**CAUTION**

**Touching unpainted surfaces with bare fingers can cause corrosion.**

4. Put on gloves (E186). Gloves shall be worn for the rest of this task.
5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. **Coat** rotor shaft **splines (3)**, input shaft **splines (4), and four bushings (5)** with corrosion preventive compound (E153 or E154).
7. **Cover splines (3 and 4) and bushings (5)** with barrier material (E81) and tape (E388).
8. **Cover indicating screen (6), electrical connector (7) and drain valve (1)** with barrier material (E81) and tape (E388).

*GO TO NEXT PAGE*

## 6-94 PREPARE AFT TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-94

9. Install transmission (2) in shipping container (T37) (8) as follows:

   a. Inspect and prepare container (8) (TB 55-8100-200-25).

   b. Connect sling (T163) (9) to four lugs (10). Connect work hoist chain (11) to sling.

   c. Remove two nuts (12) and bolts (13) from support bar (14). Remove support bar from container (8).

   d. With aid of helper, **lift transmission (2) into container (T37) (8).** Align it with two mounting brackets (15).

   e. Install support bar (14) on container (8) over transmission (2). Install two bolts (13) and nuts (12). **Torque nuts to 55 foot-pounds.**

   f. **Install two bolts (16) and nuts (17)** through brackets (15) of forward end of transmission. **Install two bolts (18) and nuts (19)** through support bar (14) at aft end of transmission (2). **Torque all nuts to 55 foot-pounds.**

   g. Remove sling (T163) (9) from transmission (2).

   h. Install two bolts (13) and nuts (12) through support bar (14). **Torque nuts to 55 foot-pounds.**

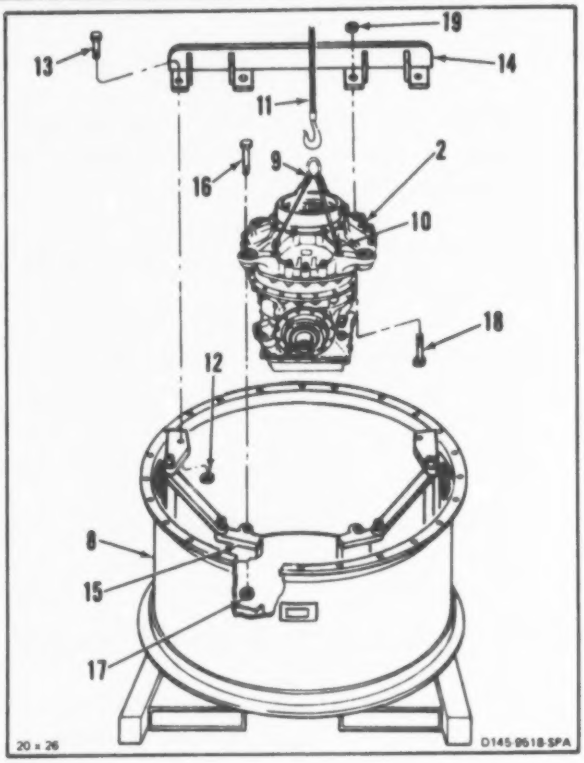
   i. Prepare required maintenance forms and reports (TM 38-750 and TB 750-126).

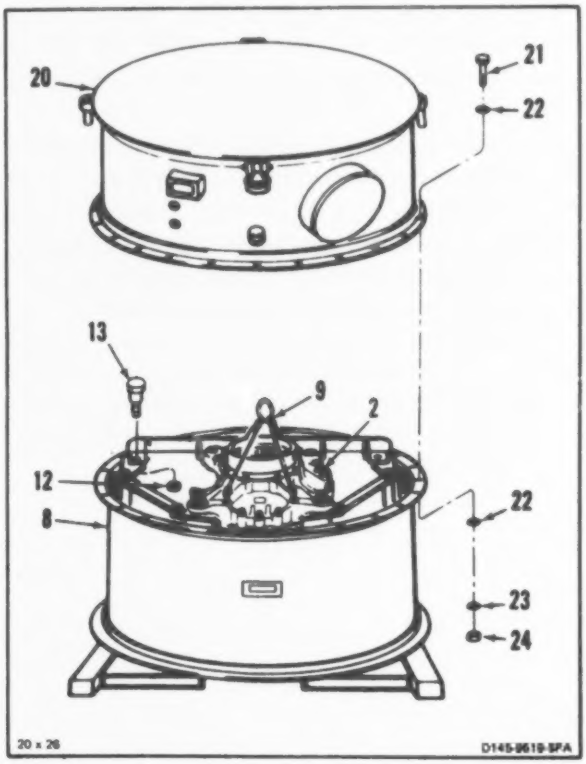
   j. Put five 16-unit bags of desiccant (E160) into container (T37) (8).

***INSPECT***

   k. **Install cover (20)** on container (T37) (8). Install bolt (21), two washers (22), split washer (23), and nut (24) at 24 places.

   l. **Torque nuts (19) at 3, 6, 9, and 12 o'clock to 275 inch-pounds. Torque nuts at 2, 4, 8, and 12 o'clock. Torque remaining nuts.**





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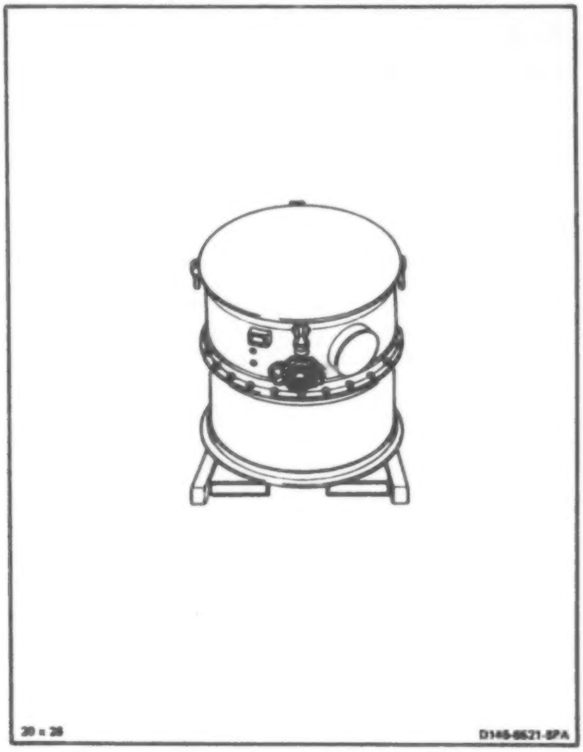
## 6-94 PREPARE AFT TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-94

FOLLOW-ON MAINTENANCE:
None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D145-6521-5PA

**END OF TASK**

## 6-95 REMOVE AFT TRANSMISSION FROM STORAGE 6-95

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Sling (T163)

Work Hoist

Container, 14-Quart

***Materials:***

Dry Cleaning Solvent (E162)

Cloths (E120)

Gloves (E186)

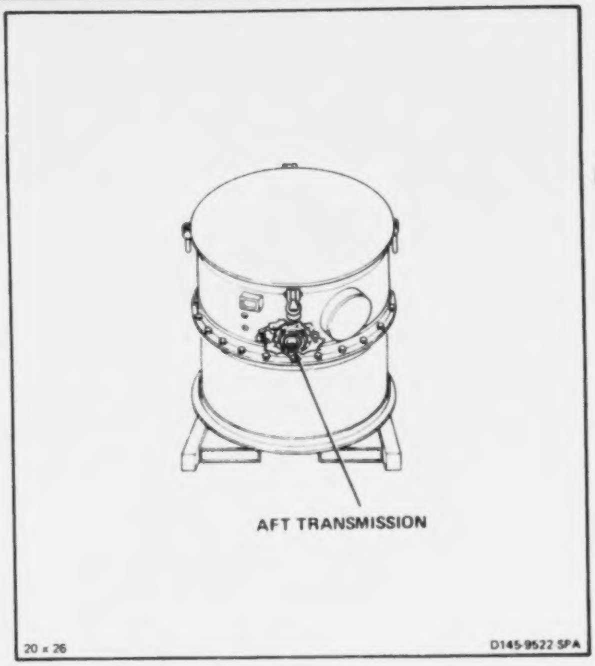
***Personnel Required:***

Medium Helicopter Repairer (4)

Inspector

***Equipment Condition:***

Off Helicopter Task


AFT TRANSMISSION
20 x 26
D145-9522 SPA

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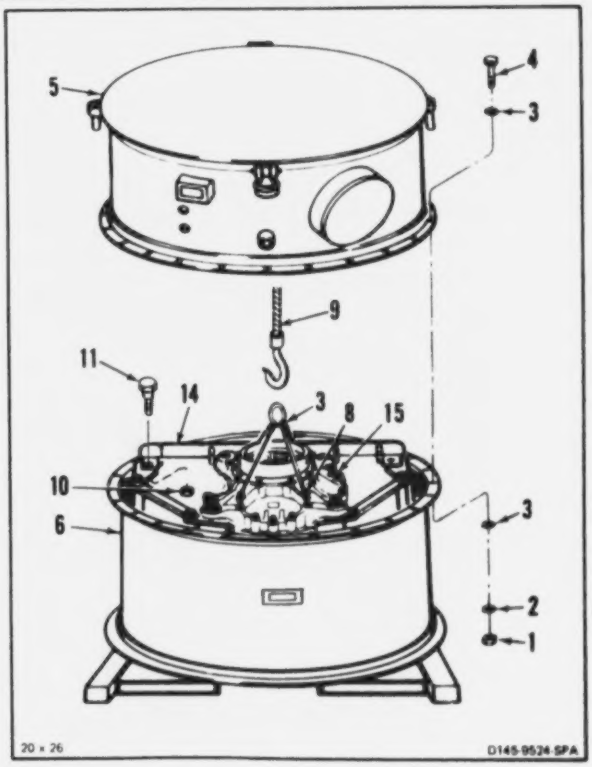
1. **Remove 24 nuts (1), washers (2 and 3), and bolts (4)** from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. **Connect sling (T163) (7)** to four lugs (8). **Connect work hoist hook (9)** to sling.
4. **Remove** two nuts (10) and **bolts (11)** from support bar (12).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D145-9524 SPA

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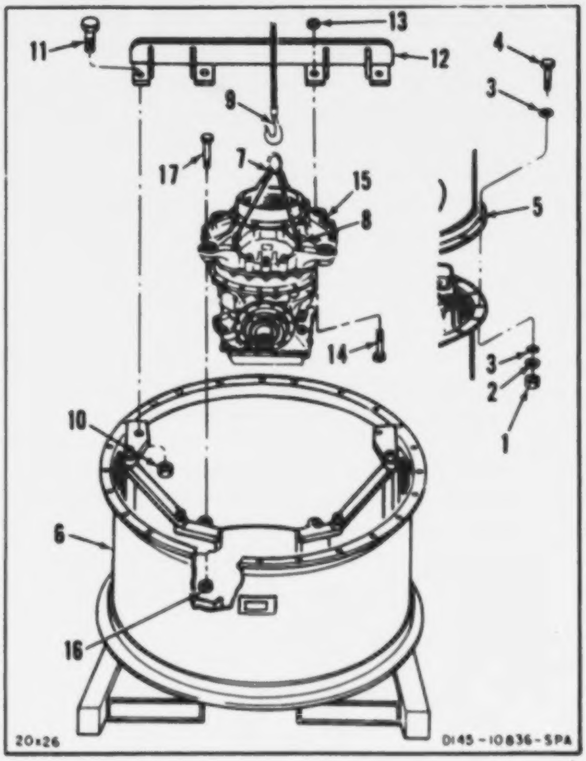
## 6-95 REMOVE AFT TRANSMISSION FROM STORAGE (Continued) 6-95



5. **Remove** two nuts (13) and **bolts (14)** from transmission (15) and support bar (12). **Remove support bar.**
6. **Remove** two nuts (16) and **bolts (17)** from forward end of transmission (15).
7. With aid of helper, carefully **lift transmission (15)** from container (6).
8. Set transmission (15) down on bench or workstand. Remove work hoist hook (9) and sling (7).
9. **Install support bar (12)** on container (6) with bolts (11) and nuts (10). Install bolts (14) and nuts (13) in bar.
10. Install cover (5). Install bolts (4), washers (3), split washers (2), and nuts (1) at 24 places.

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## 6-95 REMOVE AFT TRANSMISSION FROM STORAGE (Continued) 6-95

11. Remove all tape and barrier material from transmission (15).

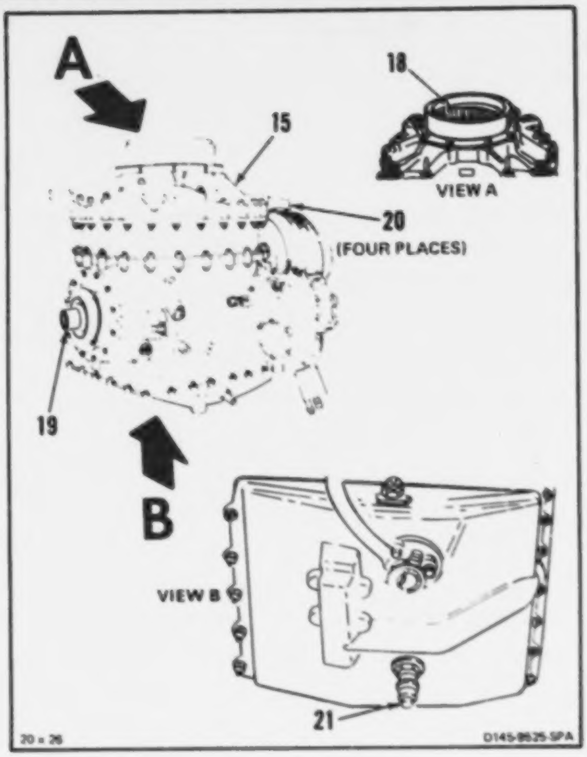
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flames. In case of contact, immediately flush skin or eyes with water for at least 15 minutes . Get medical attention for eyes.**

**CAUTION**

**Touching splines with bare fingers can cause corrosion.**

12. **Remove corrosion preventive compound** from rotor shaft **splines (18),** input shaft **splines (19), and four bushings (20).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
13. Push in drain valve (21), twist it, and pull. **Let residual oil drain** into container. Push in valve, twist it, and pull down to close.



***INSPECT***

FOLLOW-ON MAINTENANCE:

Assemble aft transmission (Task 6-96).

**END OF TASK**

## 6-96 ASSEMBLE (BUILD UP) AFT TRANSMISSION 6-96

INITIAL SETUP

***Applicable Configurations:***
All

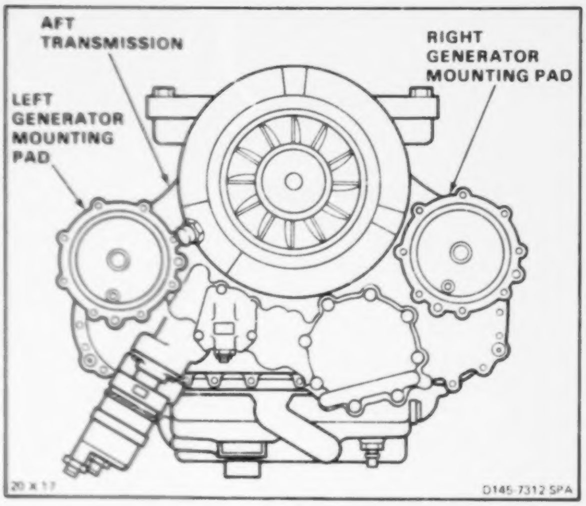
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Oil (E254)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

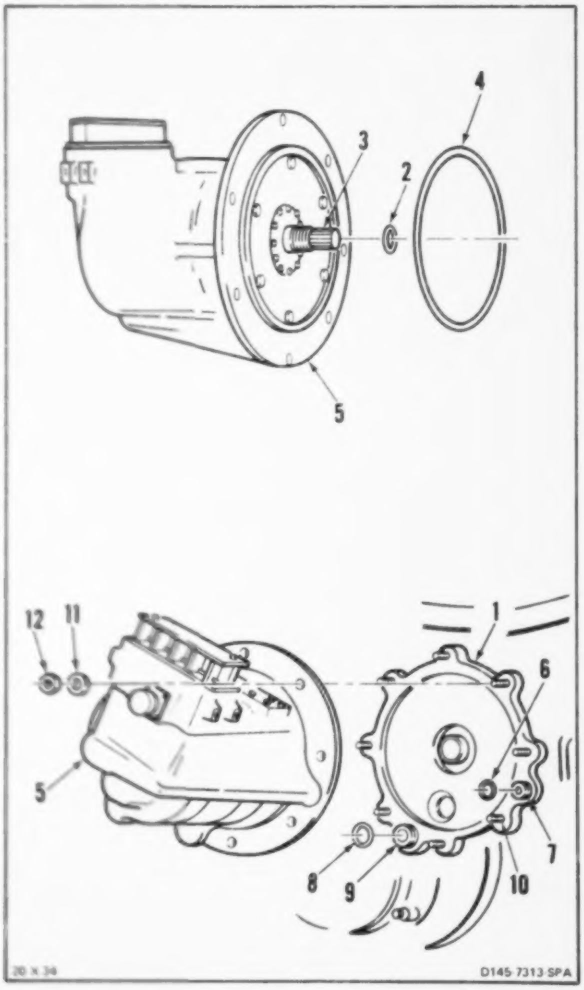
***References:***
TM 55-1520-240-23P


AFT TRANSMISSION
RIGHT GENERATOR MOUNTING PAD
LEFT GENERATOR MOUNTING PAD
20 X 17
D145-7312 SPA

**NOTE**

- Install left and right generator from aft transmission in same way. Right generator shown here.
- New transmissions have cover plates over mounting pads.

1. If applied, remove tape and barrier material from mounting pad (1).
2. **Install packing (2)** on generator drive shaft (3). **Install packing (4)** on generator (5). **Install packing (6)** on transfer tube (7). Install packing (8) on transfer tube (9).
3. Coat eight studs (10) with oil (E254). Align generator (5) with eight studs and two transfer tubes (7 and 9). **Install generator** on mounting pad (1).
4. **Install eight** washers (11) and **nuts (12). Torque nuts to 120 inch-pounds.**
5. Repeat steps 1 thru 4 for left generator.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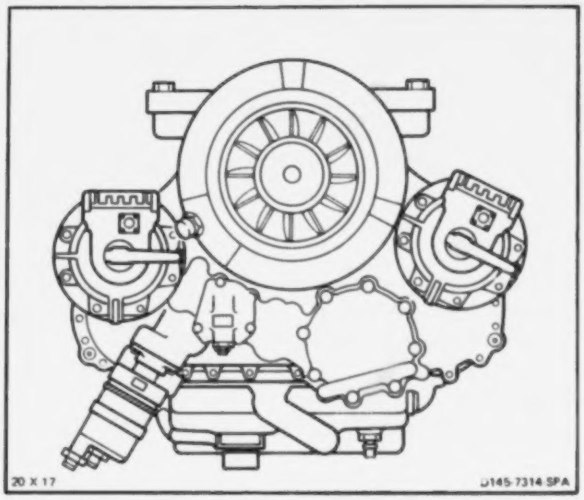
## 6-96 ASSEMBLE (BUILD UP) AFT TRANSMISSION (Continued) 6-96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*INSPECT*

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-97 INSTALL AFT TRANSMISSION 6-97

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Socket, 1 5/16-Inch
Aft Transmission Torque Adapter (T160)
Torque Pack (T23)
Tee Handle (T161)
Torque Wrench, 700 to 1600 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Workstand (2)

***Materials:***

Oil (E254)
Grease (E190)
Barrier Material (E80)

***Parts:***

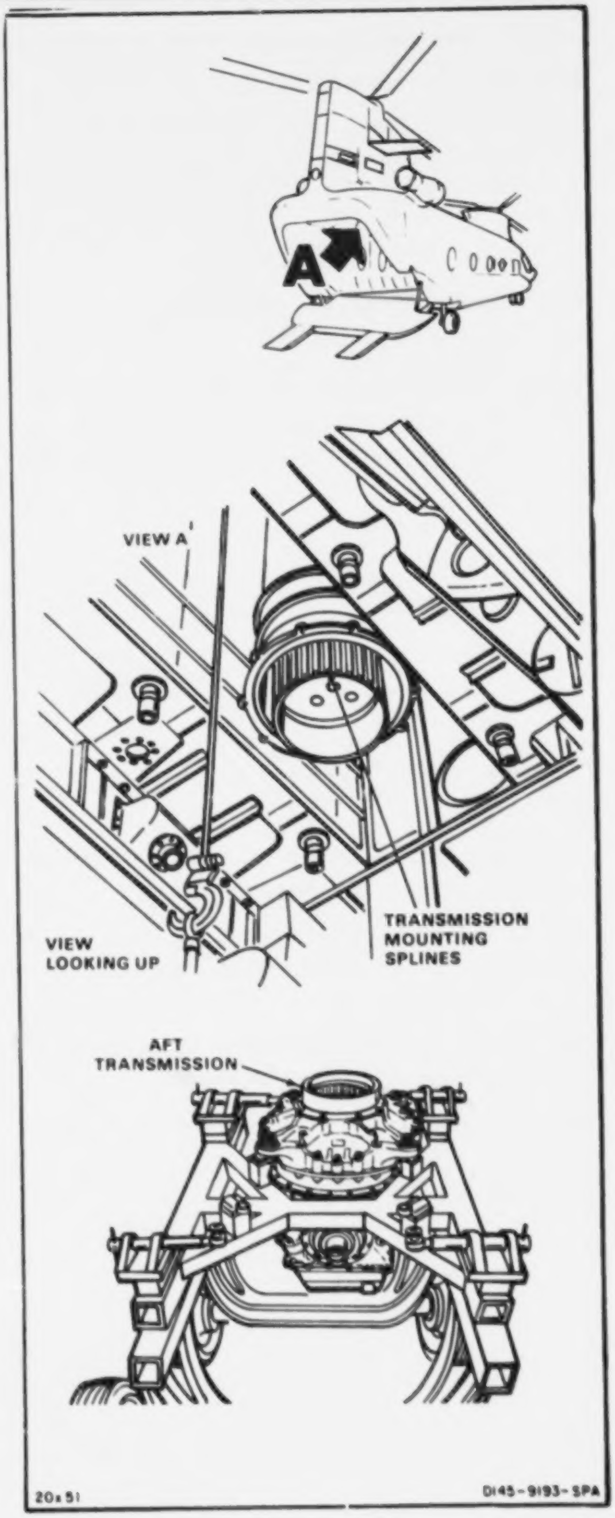
Nuts (4)

***Personnel Required:***

Medium Helicopter Repairer (5)
Inspector

***References:***

TM 55-1520-240-T
Task 2-2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TRANSMISSION MOUNTING SPLINES
AFT TRANSMISSION
20x51
D145-9193-SPA

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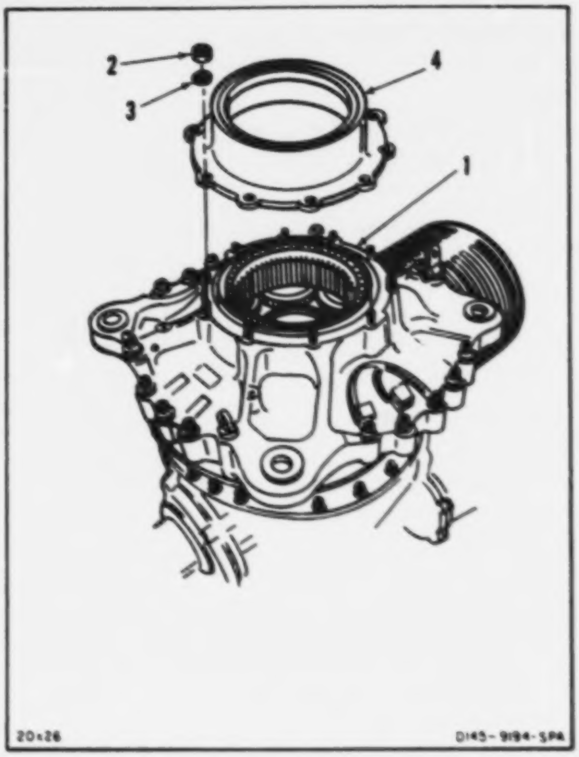
### *INSTALL TRANSMISSION*

1. Position transmission (1) in cabin of helicopter. Raise cargo ramp level with ground (TM 55-1520-240-T).

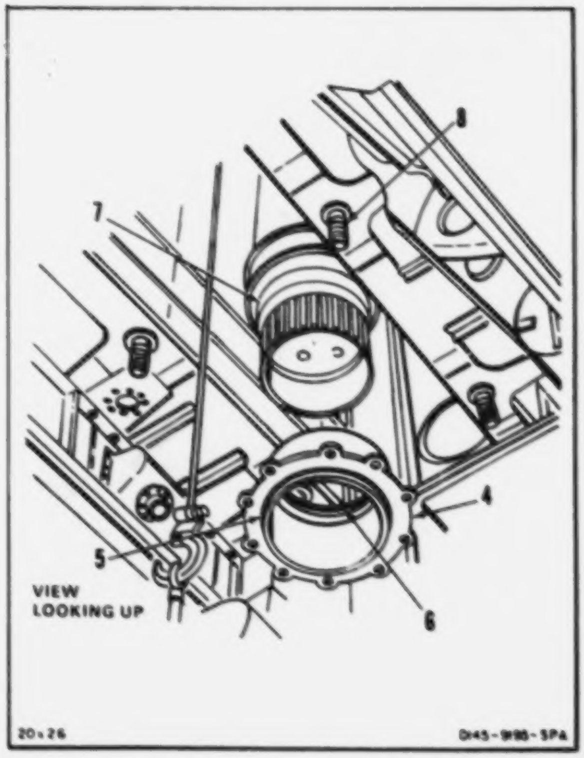
CAUTION

**If debris enters transmission, damage can result.**

2. **Remove** ten nuts (2) and washers (3) from **seal retainer (4).** Remove retainer. Cover opening in transmission (1) with barrier material (E80).



3. Check packing (5) around bottom of retainer (4) for cuts. It shall have no cuts.
4. Coat lip of seal (6) and mating surface of rotor shaft (7) with oil (E254). Coat splines of shaft with oil (E254).
5. **Install seal retainer (4) on rotor shaft (7).** Be careful not to damage seal (6).
6. Coat thread of four bolts (8) with oil (E254).



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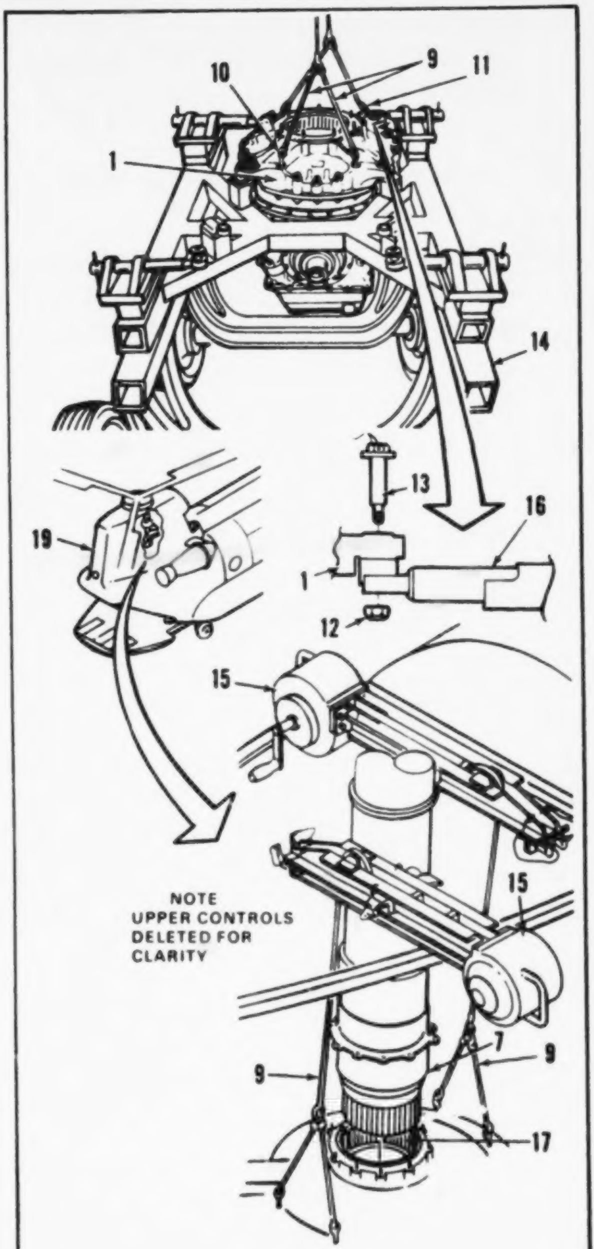
## 6-97 INSTALL AFT TRANSMISSION (Continued) 6-97

7. **Connect** two forward **sling cables (9)** to forward lifting lugs (10) on transmission (1). Connect two aft sling cables to aft lugs (11).
8. Remove barrier material from top of transmission (1). Remove four nuts (12) and bolts (13) holding transmission (1) to adapter (14).
9. Have helpers operate two hoists (15) to lift transmission (1) off adapter (14).
10. Push back two mount assemblies (16) on adapter.

**CAUTION**

**If transmission is not kept at 4 degree angle, rotor shaft splines can bind in transmission. Damage can result.**

11. Have helpers operate two hoists (15) to **lift transmission (1) to rotor shaft (7).** Keep transmission at 4 degree forward tilt angle.
12. **Mate** transmission **splines (17)** with splines of rotor shaft (7).



NOTE
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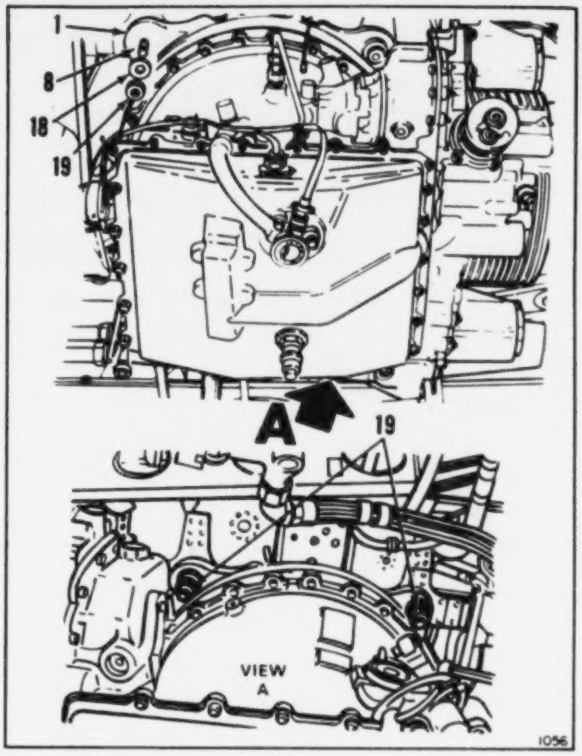
***INSTALL NUTS***

13. Align four mounting holes in transmission (1) with bolts (8). Have helpers raise transmission over bolts.

**NOTE**

Refer to Task 1-13, para 8, for re-use of self-locking nuts.

14. Install four chamfered washers (18) and new nuts (19) on bolts (8). Tighten nuts as much as possible with socket wrench handle.



*TORQUE NUTS*

**NOTE**

Torque shaft and torque adapter are part of torque adapter assembly (T160).

15. **Install torque adapter (19)** between structure (20) at sta 534 and structure (20.1) at sta 594. Flat side of base plate (21) shall face aft. Center adapter under transmission (1) and tighten four hand knobs (21.1).

**WARNING**

**Make sure ratchet selector on torque pack is set to NUT ON before applying torque. Changing ratchet settings with torque applied can damage unit and cause injury to personnel.**

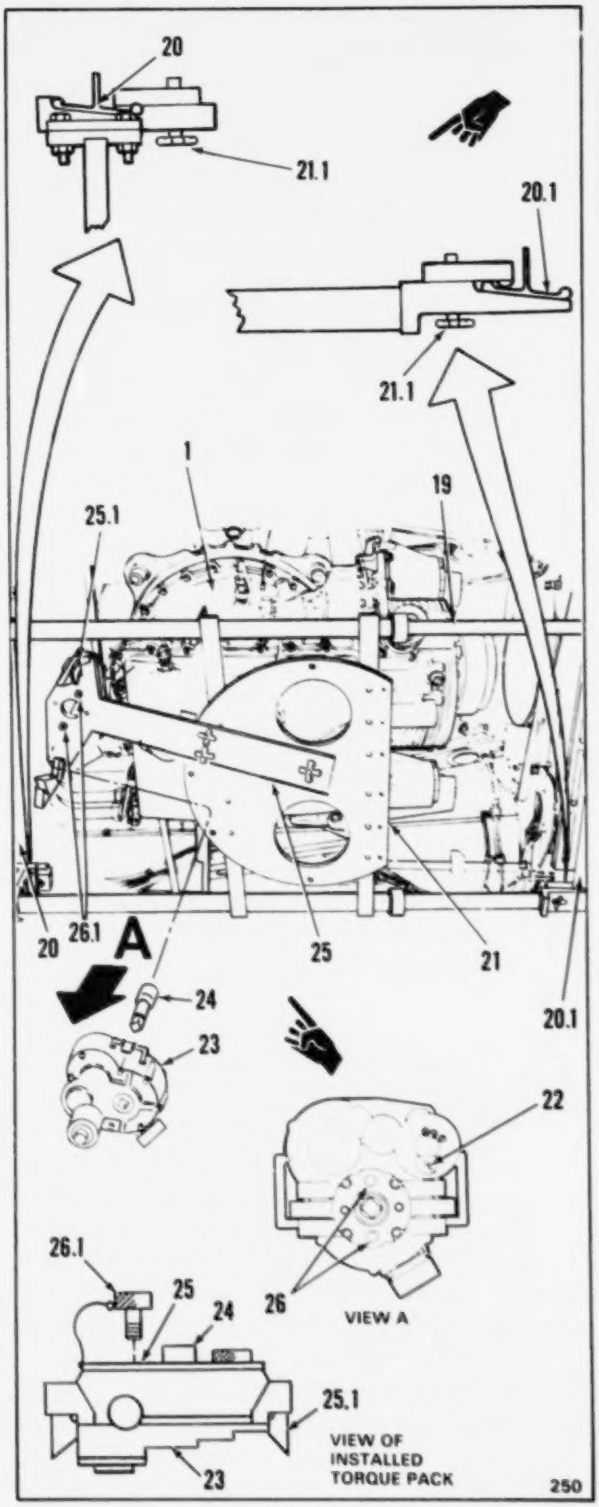
15.1. **Set ratchet selector (22) on torque pack (T23) (23) to NUT ON.**

**NOTE**

Adapter is part of torque pack (23).

15.2. **Install adapter (24)** in torque pack (T23) (23). **Install torque pack** on support (25) with two hooks (25.1). Make sure two pins (26) on bottom of torque pack engage holes in support.

15.3. **Secure torque pack (23) to support (25).** Use two thumb screws (26.1).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VIEW OF INSTALLED TORQUE PACK
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250

GO TO NEXT PAGE

16. Torque each of four transmission mounting nuts (27) as follows:

**NOTE**

Torquing of forward left nut shown here.

- a. Loosen knob (27.1)
- b. If torquing a forward nut (27), position support (25) directly under nut to be torqued. If torquing an aft nut, position support straight out to side of nut to be torqued. Install and tighten two knob assemblies (28) through support (25) and base plate (21).
- c. Tighten knob (27.1).

**NOTE**

Torque shaft is spring-loaded and compresses for installation.

- d. Place one end of torque shaft (28.1) on adapter shaft (24). Place other end on nut (27).

**WARNING**

**Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.**

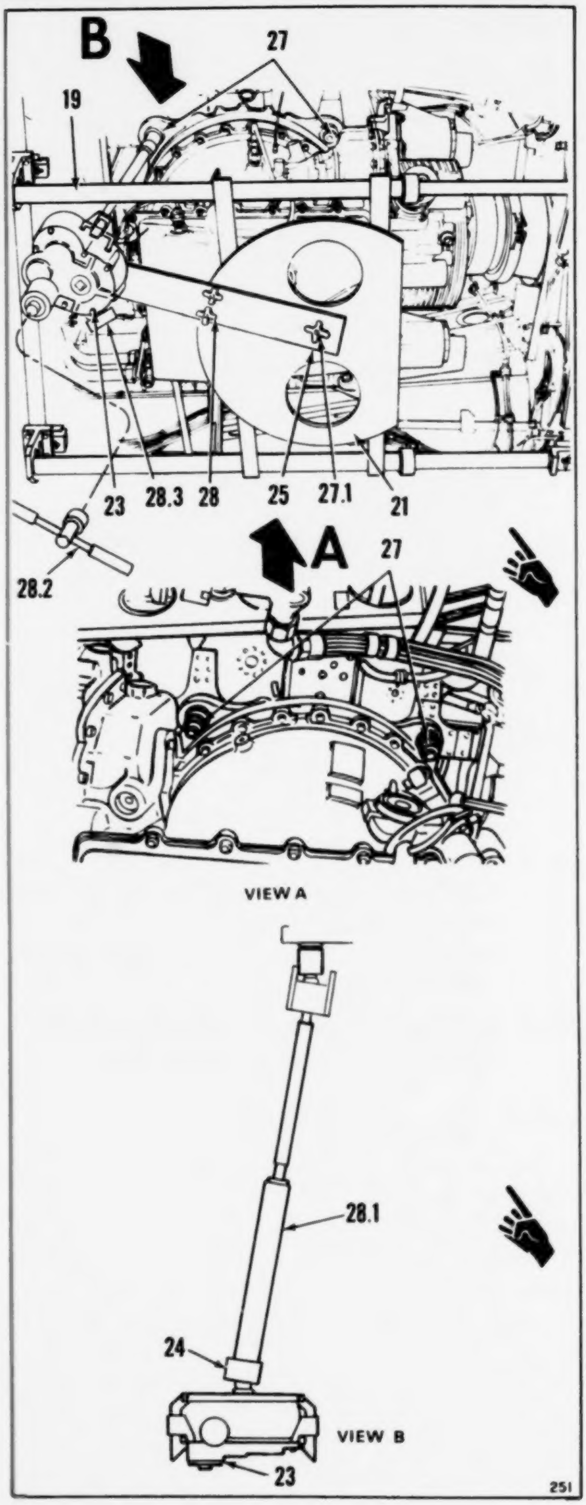
**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

- e. Set tee handle (T161) (28.2) to ON. Install handle on torque pack (T23) (23). Turn handle clockwise until indicator (28.3) reads 620 foot-pounds. Set tee handle to OFF. Turn handle counterclockwise until torque indicator reads 0 and torque pack (23) is loose.
- f. Remove torque shaft (28.1).

16.1. Remove torque pack (23) from support (25).

16.2. Remove torque adapter (19) from helicopter structure.



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## 6-97 INSTALL AFT TRANSMISSION (Continued) 6-97

### *CONNECT TRANSMISSION*

17. Slide exhaust duct (29) forward against fan (30). Coat thread of clamp (31) with oil (E254). **Install clamp around duct and fan. Torque clamp to 35 inch-pounds.**
18. **Connect oil hose (32)** to adapter (33).
19. **Connect electrical connector (34)** to indicating screen and chip detector (35). **Connect electrical connector (36)** to temperature bulb (37). **Install four clamps (38)** to clips (39) on sump (40) with screws (41), washers (42), and nuts (43).
20. **Connect electrical connector (44)** to main oil pressure switch (45). **Connect electrical connector (46)** to auxiliary oil pressure switch (47).

CAUTION

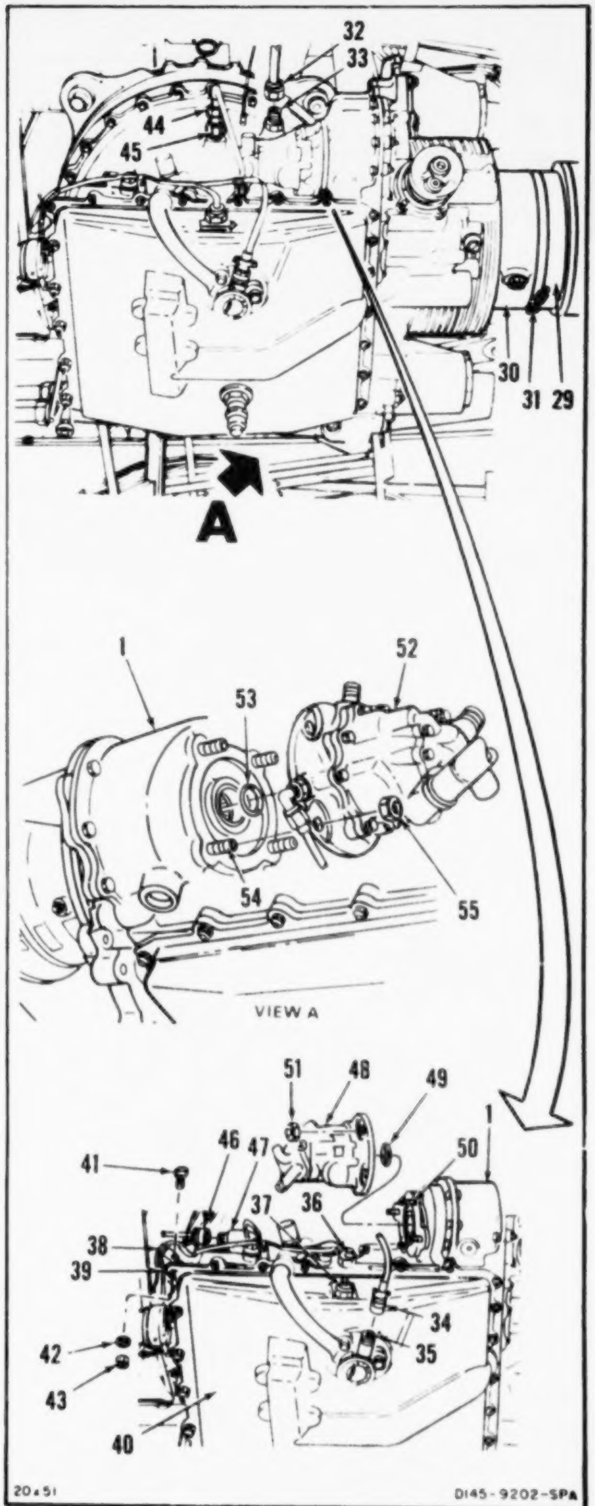
**Do not kink hoses when handling pump.**

21. Pack splines of flight control hydraulic pump (48) and mating splines in transmission (1) with grease (E190). **Install pump**, with packing (49), on four studs (50). Install nuts (51). **Torque nuts to 85 inch-pounds.**

CAUTION

**Do not kink hoses when handling pump.**

22. Pack splines of utility hydraulic system pump (52) and mating splines in transmission (1) with grease (E190). **Install pump**, with packing (53), on four studs (54). Install nuts (55). **Torque nuts to 85 inch-pounds.**



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## 6-97 INSTALL AFT TRANSMISSION (Continued) 6-97

**NOTE**

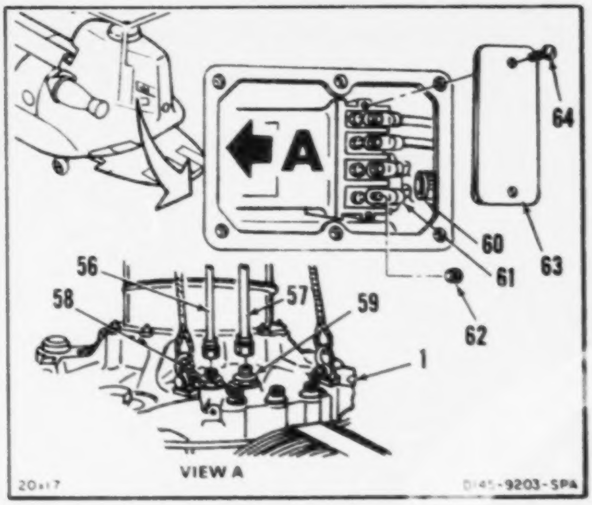
Oil hoses are reached through generator access holes on each side of pylon.

23. **Connect two oil hoses (56 and 57)** to reducers (58 and 59) on top of transmission (1).

**NOTE**

Connect wires to left and right generator in same way. Connections are reached through access holes on each side of pylon.

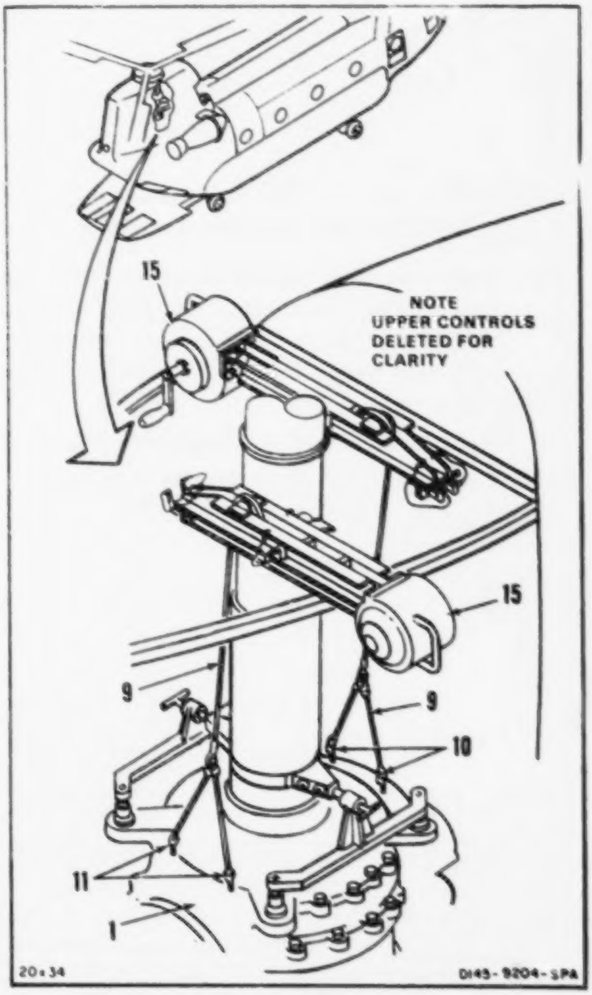
24. **Connect electrical connector (60)** to generator. **Connect four wires (61)** to generator with nuts (62). Install cover plate (63) with two screws (64).


A
64
60
61
63
62
56
58
57
59
1
VIEW A
20x17
D145-9203-SPA

*REMOVE HOIST KIT*

25. Working from cabin, **disconnect cables (9)** of forward hoist (15) from two forward lifting lugs (10) on transmission (1). Working from side of pylon, disconnect cables of aft hoist from two aft lifting lugs (11) on transmission (1).

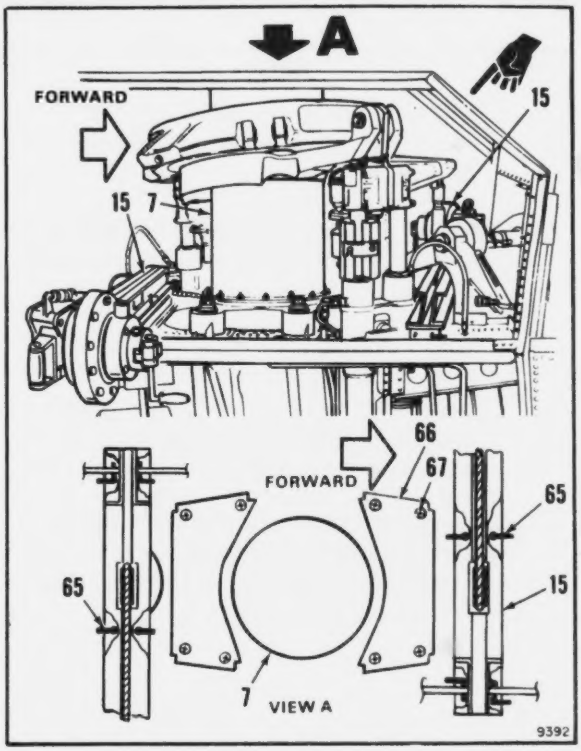
26. Have helpers operate two hoists (15) to **raise cables (9).**


15
NOTE
UPPER CONTROLS
DELETED FOR
CLARITY
15
9
9
10
11
1
20x34
D145-9204-SPA

*GO TO NEXT PAGE*

## 6-97 INSTALL AFT TRANSMISSION (Continued) 6-97

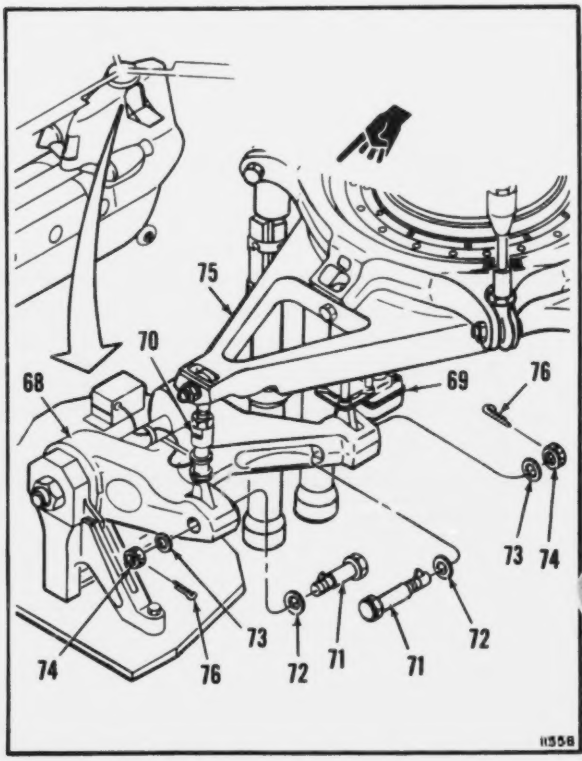
27. Release four pins (65) from each hoist (15). **Remove two hoists.**
28. **Install cover plate (66)** forward of rotor shaft (7). Tighten four turnlock fasteners (67).


A
FORWARD
15
15
7
66
67
FORWARD
65
65
15
7
VIEW A
9392

**NOTE**

Long bolt goes through fixed link.

29. Untie yoke (68). **Install actuator (69) and link (70) in yoke.** Install two bolts (71), heads facing each other, recessed washers (72), with recess toward bolt head, washers (73), and nuts (74).
30. Install actuator (69) in swashplate yoke (75).
31. **Torque nuts (74) to 400 to 780 inch-pounds** . Install cotter pins (76).


75
70
68
69
76
73
74
74
76
73
72
71
71
72
11558

GO TO NEXT PAGE

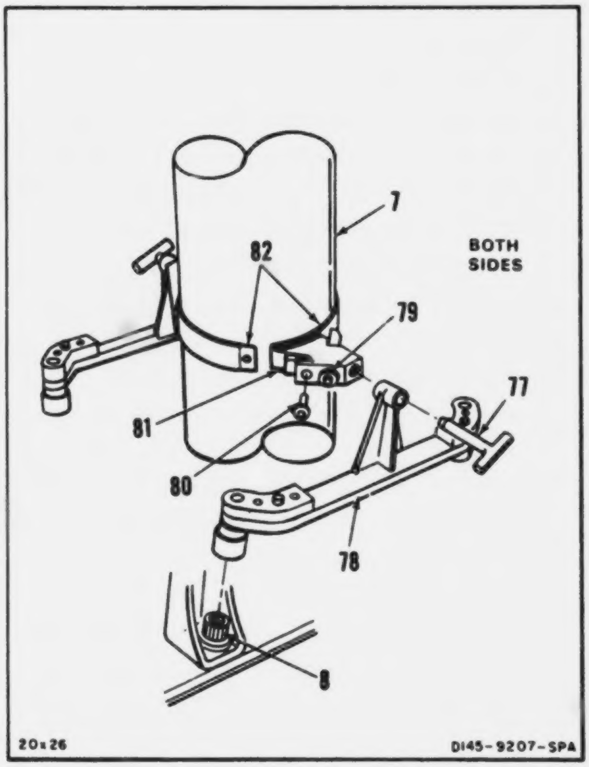
## 6-97 INSTALL AFT TRANSMISSION (Continued) 6-97

### *REMOVE AFT ROTOR SHAFT SECURING DEVICE*

**NOTE**

Securing device is removed with aid of helper through access holes in pylon.

32. Remove pins (77) from each side of rotor shaft (7). **Remove two adapter bars (78)** from bolts (8).
33. Loosen two knobs (79). Remove pins (80) from plates (81). **Remove two clamps (82).**

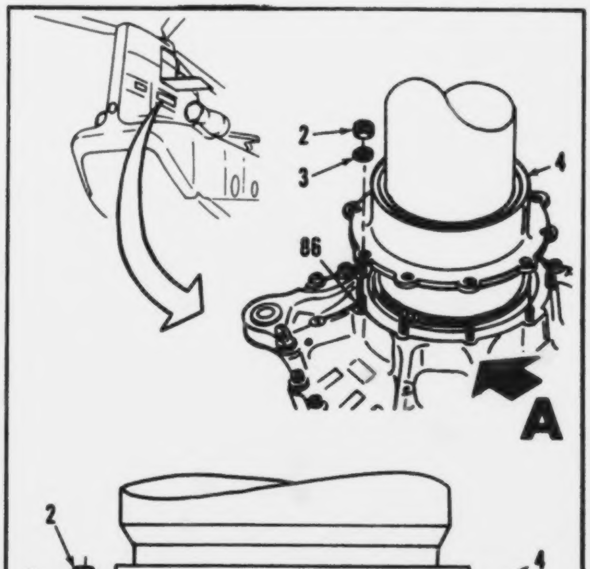

7
82
BOTH SIDES
79
77
81
80
78
8
20x26
D145-9207-SPA

### *INSTALL SEAL RETAINER*

**NOTE**

Seal retainer is reached through open aft transmission access doors on each side of aft pylon.

34. **Align tab (83)** on seal retainer (4) with slot (84) in outer race of bearing (85). **Install seal retainer** on studs (86).
35. Install 10 washers (3) and nuts (2). **Torque nuts to 60 inch-pounds.**


2
3
4
86
A
2
3
4
86
83
84
85
VIEW A
20x26
D145-9197-SPA

*GO TO NEXT PAGE*

***INSPECT***

FOLLOW-ON MAINTENANCE:

Remove aft servocylinder safety blocks (Task 11-29).

Connect aft rotor pitch links (Task 5-99).

Install aft transmission adapter assembly (Task 6-25).

Phase rotary-wing blades (Task 6-28).

Install No. 9 drive shaft (Task 6-29).

Install aft pylon access doors to generators and transmission (Task 2-2).

Service aft transmission (Task 1-54).

Close aft pylon left and right work platforms (Task 2-2).

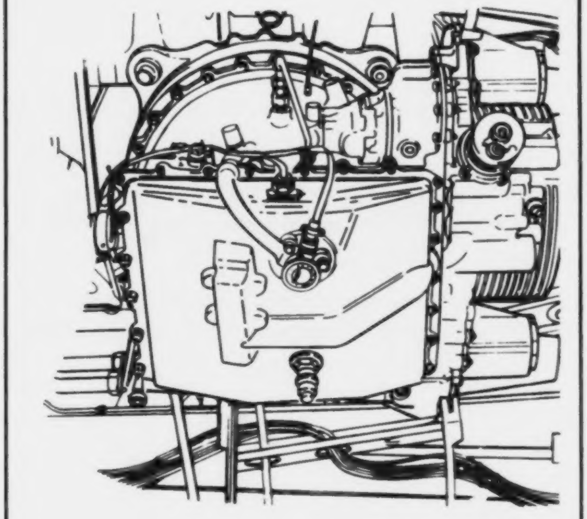
Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

Perform ground run (TM 55-1520-240-10).

Retorque transmission mounting nuts after 25 flight hours .



**END OF TASK**

# SECTION VII
# ENGINE TRANSMISSION

## 6-98 REMOVE ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL 6-98

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267

***Materials:***

None

***Personnel Required:***

Aircraft Powertrain Repairer

***Equipment Condition:***

Battery Disconnected (Task 1-39)

Electrical Power Off

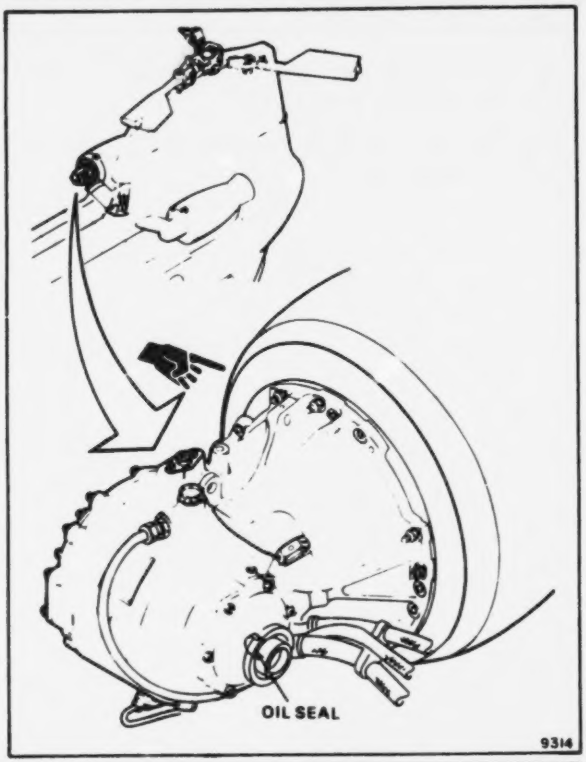
Engine Air Inlet Screen Removed (Task 4-65)

Engine Transmission Fairing Removed (Task 4-70)

Pylon Hinged Fairing Open (Task 2-2)

Pylon Lower Fairing Open (Task 2-2)

Engine Drive Shaft and Engine Transmission Adapter Assembly Removed (Task 6-30)



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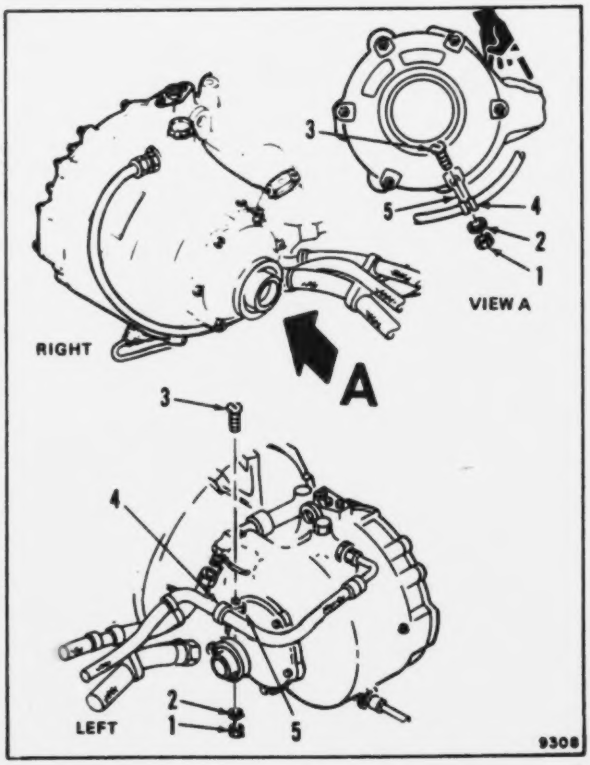
**NOTE**

- Procedure is similar to remove seal from left or right transmission. Removal of right transmission seal is shown here.
- Breather hose on left transmission is held by one clamp. Hose on right transmission is held by two clamps.

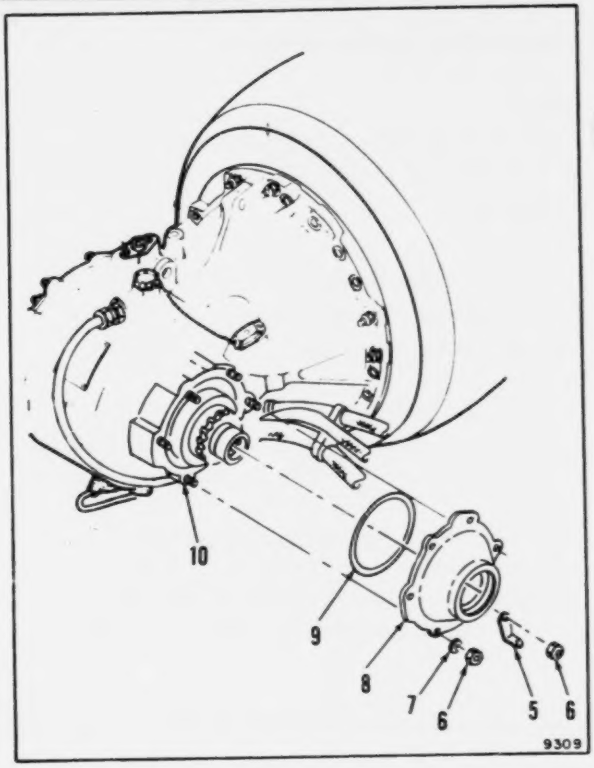
1. **Remove** nut (1), washer (2), screw (3), and **hose clamp (4)** from clip (5).



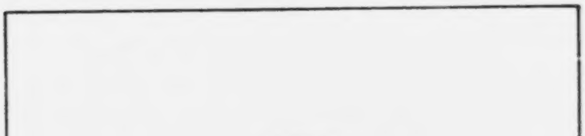
**GO TO NEXT PAGE**

## 6-98 REMOVE ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL (Continued) 6-98

2. Remove six nuts (6), five washers (7), and clip (5) from retainer (8).
3. **Remove retainer (8)** and packing (9) from transmission (10).


10
9
8
7
6
5
6
9309

4. Remove retaining ring (11). **Remove seal (12)** and packing (13) from retainer (8).


11
12
13
8
20 X 26
D145-8070-9PA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL 6-99

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun-Type Heater
Pyrometer
Aluminum Tube, 3-Inch OD, 1/8-Inch-Thick Wall, 1 to 6 Inches Long
Torque Wrench, 30 to 150 Inch-Pounds
Kevlar Gloves (E187)

***Materials:***

Gloves (E186)
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)

***Parts:***

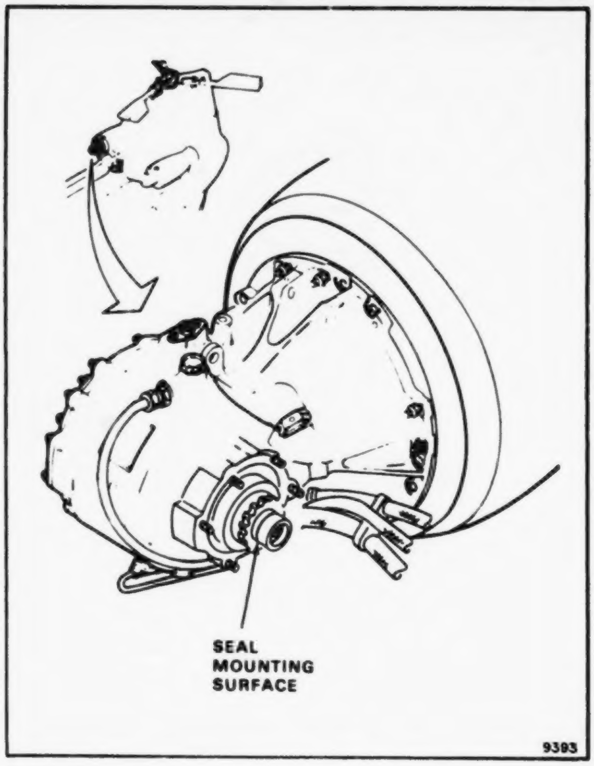
Packings

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1520-240-23P



*GO TO NEXT PAGE*

## 6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL (Continued) 6-99

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

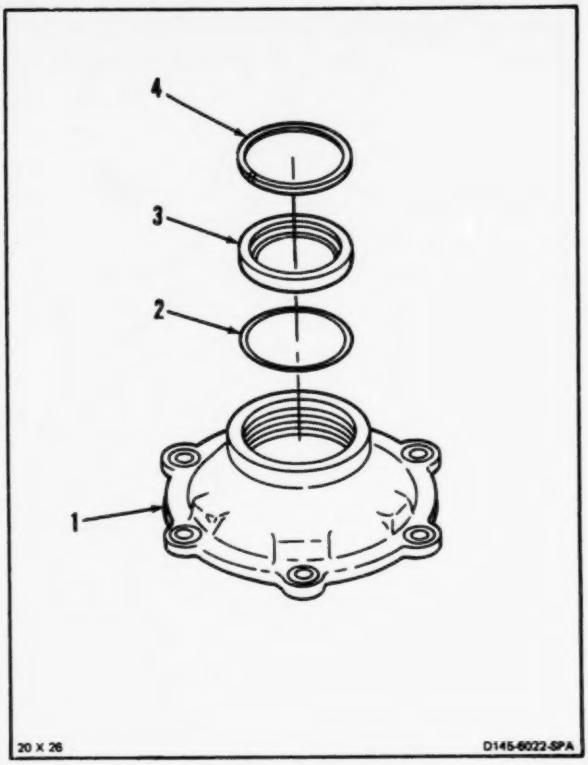
**WARNING**

**Wear Kevlar gloves (187) when handling hot retainer.**

**CAUTION**

**Do not heat retainer over 250°F (120°C).**

2. **Heat retainer (1) to 230° to 250°F (110° to 120°C).** Use gun-type heater. Wear gloves (E187). Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. **Install seal (3)** in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



20 X 26

D145-6022-SPA

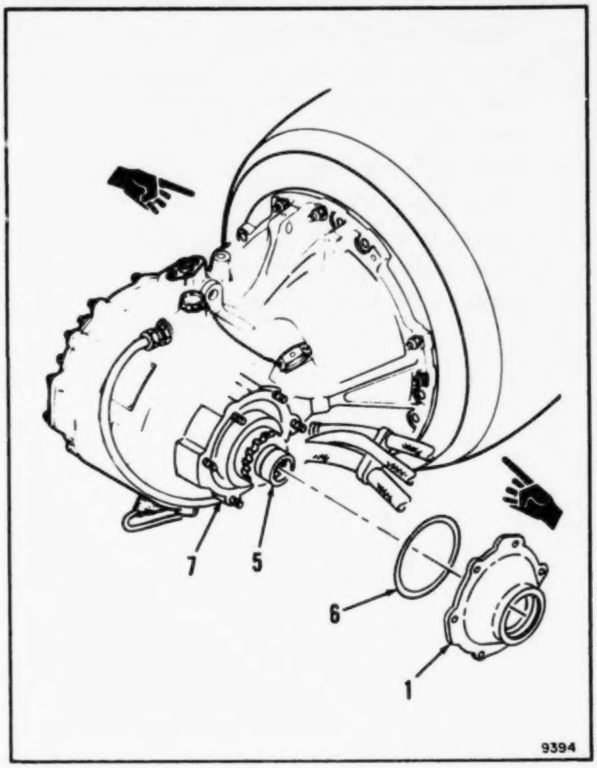
GO TO NEXT PAGE

## 6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL (Continued) 6-99

**NOTE**

Procedure is similar to install retainer on left or right transmission. Installation on right transmission is shown here. Differences are noted in steps.

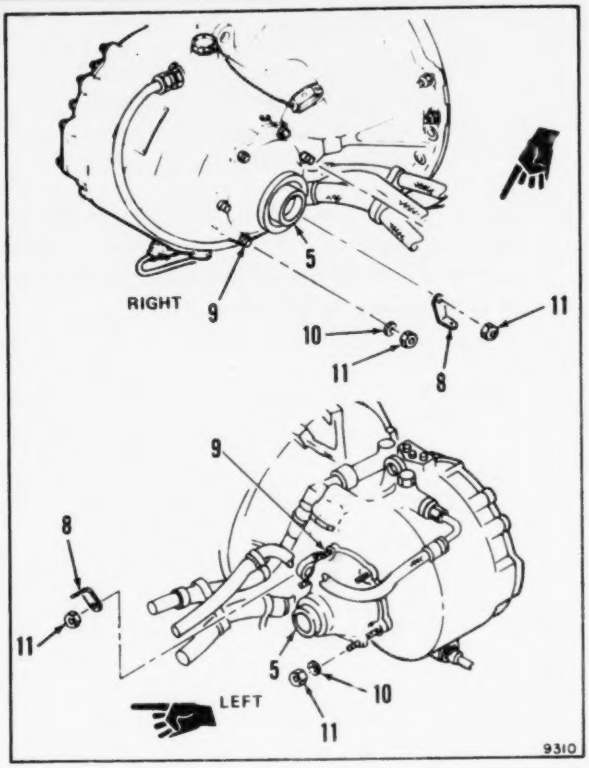
6. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (5). **Install retainer (1)** and packing (6) on transmission (7).



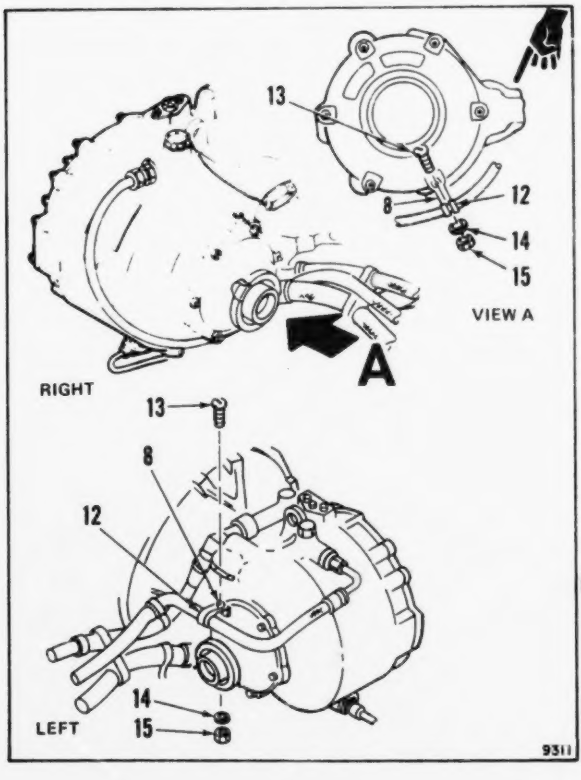
*GO TO NEXT PAGE*

## 6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL (Continued) 6-99

7. **Install clip (8)** on stud (9). On left transmission, install clip at 11 o'clock position . On right transmissions, install clip at 5 o'clock position .
8. Install four washers (10) on studs (9) that have no clip (8).
9. **Install six nuts (11).** Check that clips (8) point away from center of shaft (5). **Torque nuts to 60 inch-pounds .**


5
RIGHT
9
10
11
11
8
9
8
11
5
LEFT
10
11
9310

10. **Install hose clamp (12)** on clip (8). Install screw (13), washer (14), and nut (15).


13
8
12
14
15
VIEW A
A
RIGHT
13
8
12
14
15
LEFT
9311

*GO TO NEXT PAGE*

## 6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL (Continued) 6-99

***INSPECT***

FOLLOW-ON MAINTENANCE:

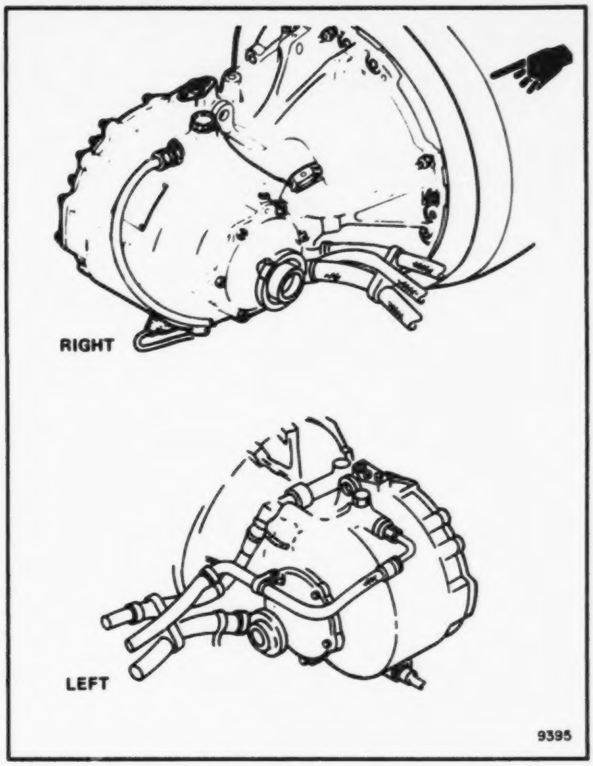
Install engine transmission adapter assembly and engine drive shaft (Task 6-32).

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).

Install engine transmission fairing (Task 4-73).

Install engine air inlet screen (Task 4-76).



**END OF TASK**

## 6-99.1 REMOVE ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES 6-99.1

INITIAL SETUP

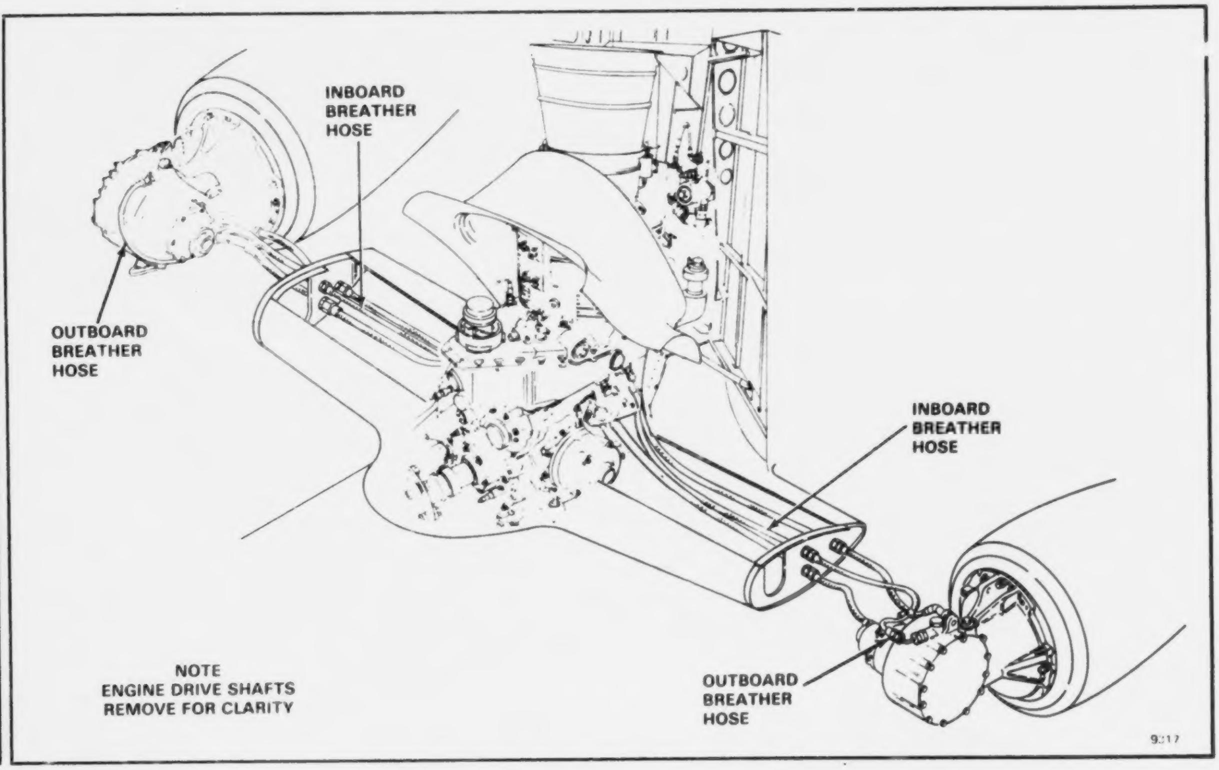
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

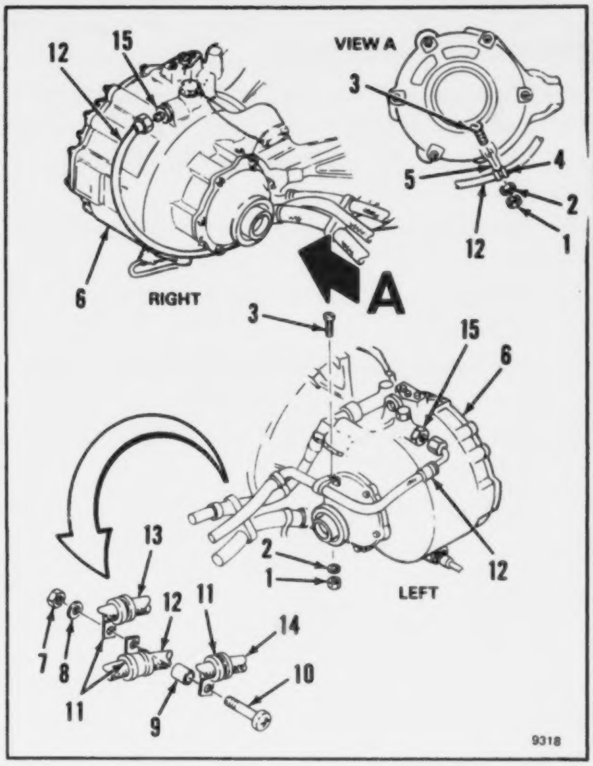
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screens Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)


INBOARD BREATHER HOSE
OUTBOARD BREATHER HOSE
INBOARD BREATHER HOSE
OUTBOARD BREATHER HOSE
9:17

NOTE
ENGINE DRIVE SHAFTS REMOVE FOR CLARITY

GO TO NEXT PAGE

## 6-99.1 REMOVE ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued) 6-99.1

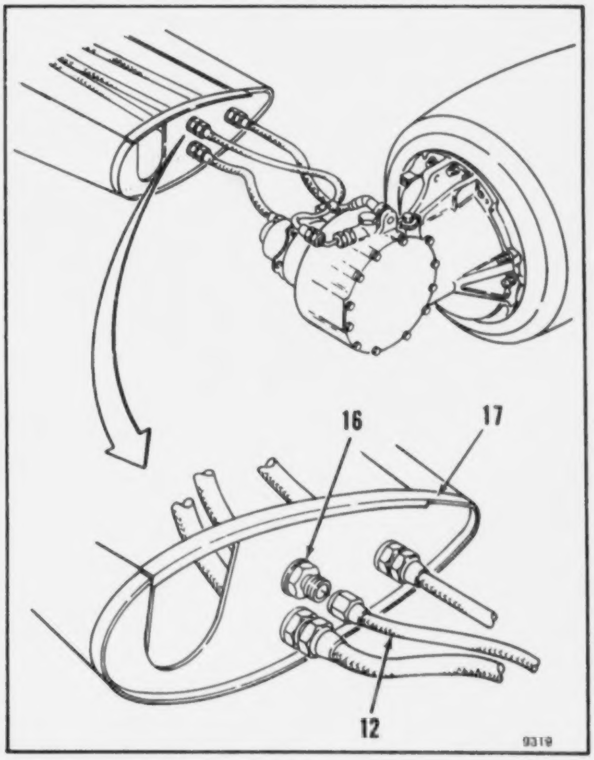

12
15
VIEW A
3
4
5
2
12
1
6
RIGHT
A
3
15
6
13
2
1
12
LEFT
12
11
14
7
8
10
11
9
9318

**NOTE**

Removal of left or right hose assemblies is similar.

***REMOVE OUTBOARD HOSE***

1. Remove nut (1), washer (2) and screw (3) from clamp (4). **Remove clamp from clip (5)** on engine transmission (6).
2. **Remove** nut (7), washer (8), spacer (9) and **screw (10) from clamps (11). Lift breather hose (12)** clear of hoses (13 and 14).
3. **Disconnect hose (12) from reducer (15)** at engine transmission (6).


16
17
12
9319

4. **Disconnect hose (12) from union (16)** at bulkhead (17).
5. Remove hose (12).

***GO TO NEXT PAGE***

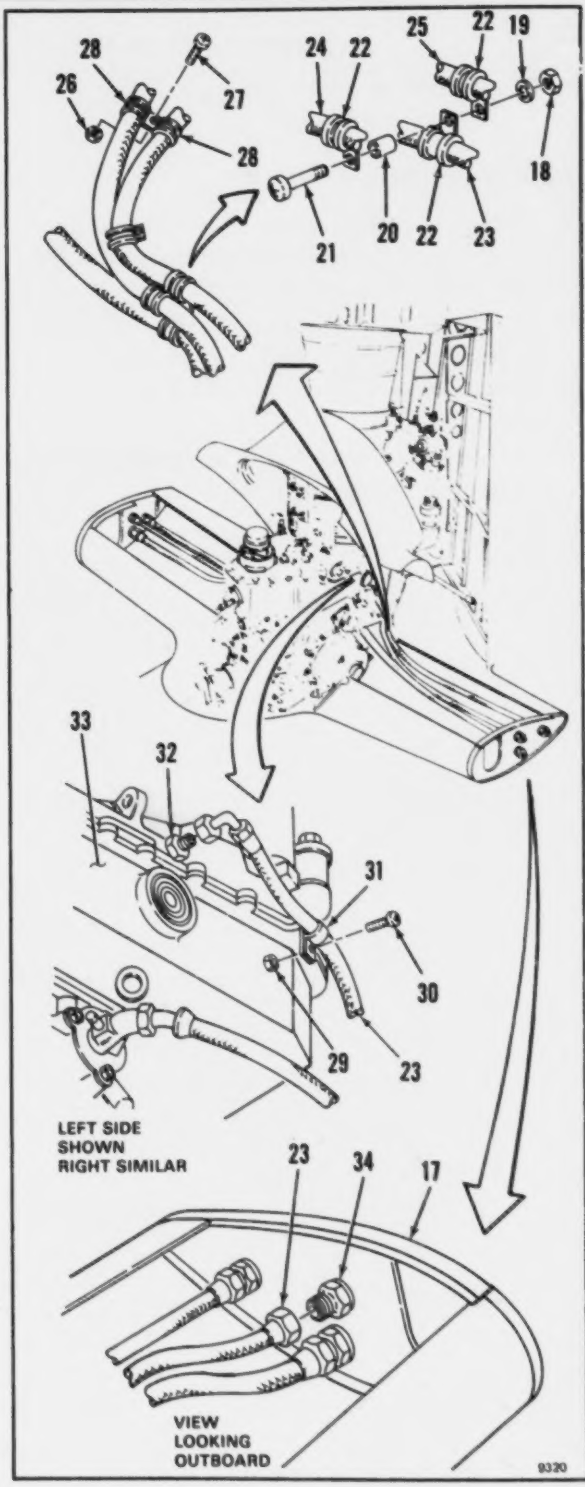
## 6-99.1 REMOVE ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued) 6-99.1

### *REMOVE INBOARD HOSE*

6. **Remove** nut (18), washer (19), spacer (20) and **screw (21)** from clamps (22). Lift breather hose (23) clear of hoses (24 and 25).
7. **Remove** nut (26) and **screw (27)** from clamps (28).
8. **Remove** nut (29) and **screw (30)** from clamp (31).
9. **Disconnect hose (23) from reducer (32)** at combining transmission (33).
10. **Disconnect hose (23) from union (34)** at bulkhead (17).
11. Remove hose (23).

FOLLOW-ON MAINTENANCE:

None


28
26
27
28
25
22
19
24
22
18
21
20
22
23
33
32
31
30
29
23
LEFT SIDE SHOWN RIGHT SIMILAR
23
34
17
VIEW LOOKING OUTBOARD
9320

END OF TASK

## 6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES 6-99.2

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***

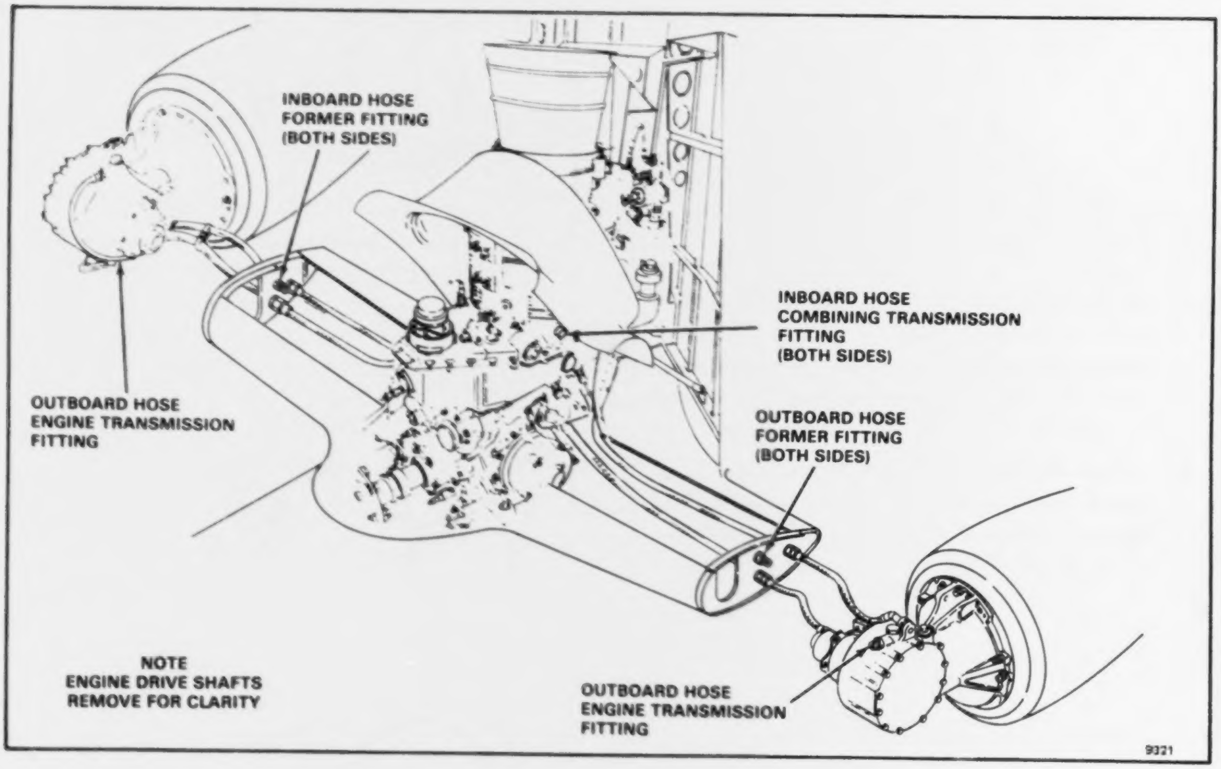
Oil (E253 or E254)

***Personnel Required:***

Medium Helicopter Repairer
Inspector

***References:***

TM 55-1520-240-23P


INBOARD HOSE
FORMER FITTING
(BOTH SIDES)
INBOARD HOSE
COMBINING TRANSMISSION
FITTING
(BOTH SIDES)
OUTBOARD HOSE
ENGINE TRANSMISSION
FITTING
OUTBOARD HOSE
FORMER FITTING
(BOTH SIDES)
NOTE
ENGINE DRIVE SHAFTS
REMOVE FOR CLARITY
OUTBOARD HOSE
ENGINE TRANSMISSION
FITTING
9321

**GO TO NEXT PAGE**

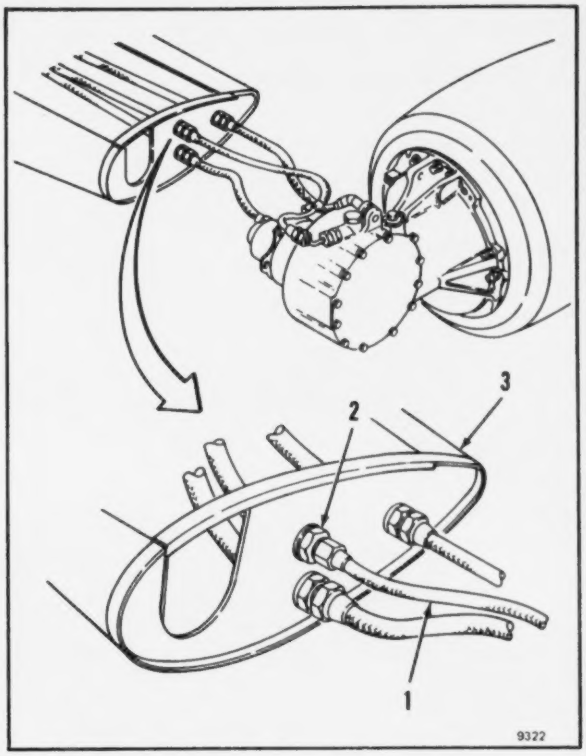
## 6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued) 6-99.2

**NOTE**

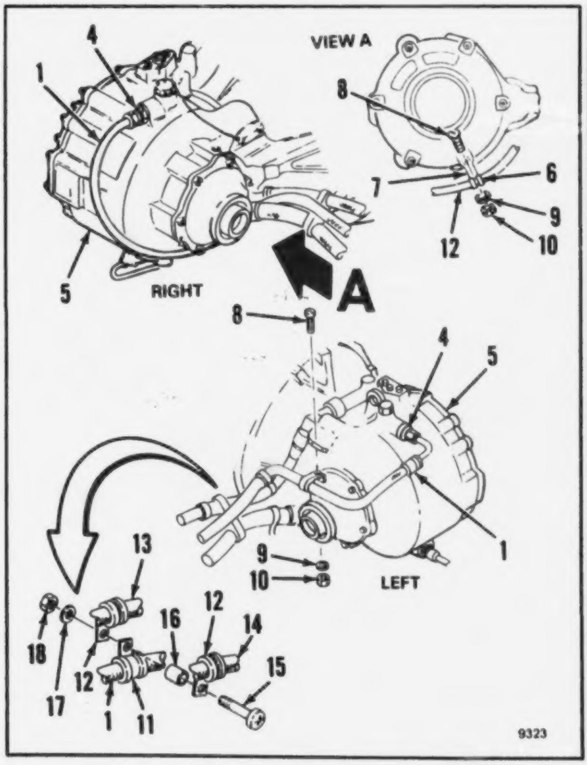
Installation of left or right hose assemblies is similar.

### *INSTALL OUTBOARD HOSE*

1. **Coat thread** at ends of hose (2) **with oil (E253 or E254).**
2. **Connect hose (1) to union (2)** at bulkhead (3).



3. **Connect hose (1) to reducer (4)** at engine transmission (5).
4. **Align clamp (6) with clip (7)** on engine transmission (5). **Install screw (8),** washer (9), and nut (10).
5. **Align clamp (11)** on breather hose (1) **with clamps (12)** on hoses (13 and 14). **Install screw (15),** spacer (16), washer (17), and nut (18).

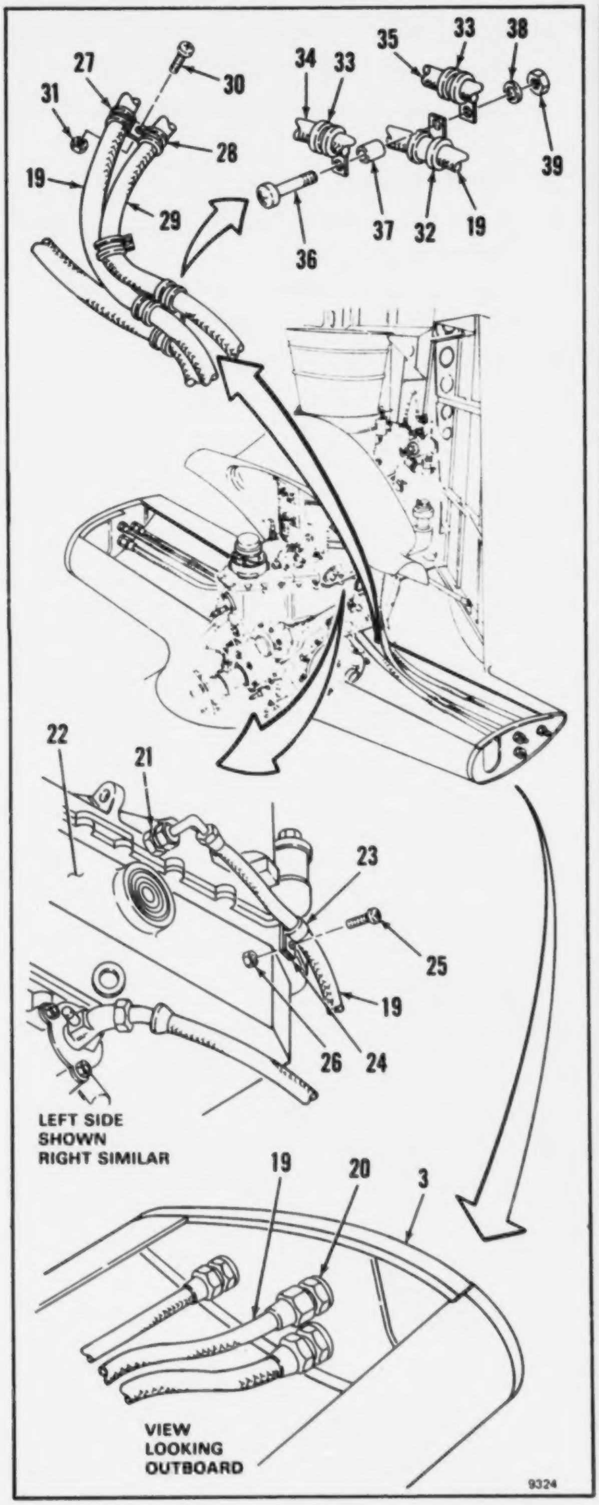

4
1
VIEW A
8
6
7
9
12
10
5
RIGHT
A
8
4
5
13
9
10
LEFT
1
12
16
14
18
15
12
17
1
11
9323

GO TO NEXT PAGE

## 6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued) 6-99.2

### *INSTALL INBOARD HOSE*

6. **Coat thread** at ends of hose (19) **with oil (E253 or E254).**
7. **Connect hose (19) to union (20)** at bulkhead (3).
8. **Connect hose (19) to reducer (21)** at combining transmission (22).
9. **Align clamp (23) with clip (24)** on combining transmission (22). **Install screw (25)** and nut (26).
10. **Align clamp (27)** on breather hose (19) **with clamp (28)** on hose (29). **Install screw (30)** and nut (31).
11. **Align clamp (32)** on breather hose (19) **with clamps (33)** on hoses (34 and 35). **Install screw (36),** spacer (37), washer (38), and nut (39).


35
33
38
27
34
33
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39
28
19
29
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32
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36
22
21
23
25
19
26
24
LEFT SIDE
SHOWN
RIGHT SIMILAR
19
20
3
VIEW
LOOKING
OUTBOARD
9324

*GO TO NEXT PAGE*

## 6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES (Continued) 6-99.2

FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Install engine transmission fairing (Task 4-73).

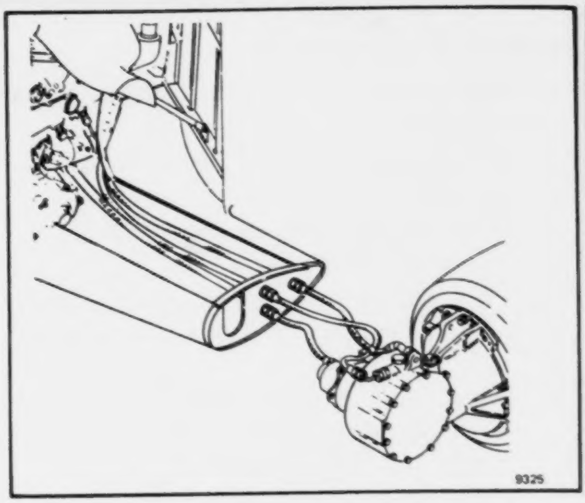
Install engine air inlet screen (Task 4-76).

Close engine drive shaft access cover (Task 2-2).

Service engine transmission (Task 1-54).

Close pylon access doors (Task 2-2).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES 6-99.3

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 1/8-Inch
Container, Two-Quart

***Materials:***

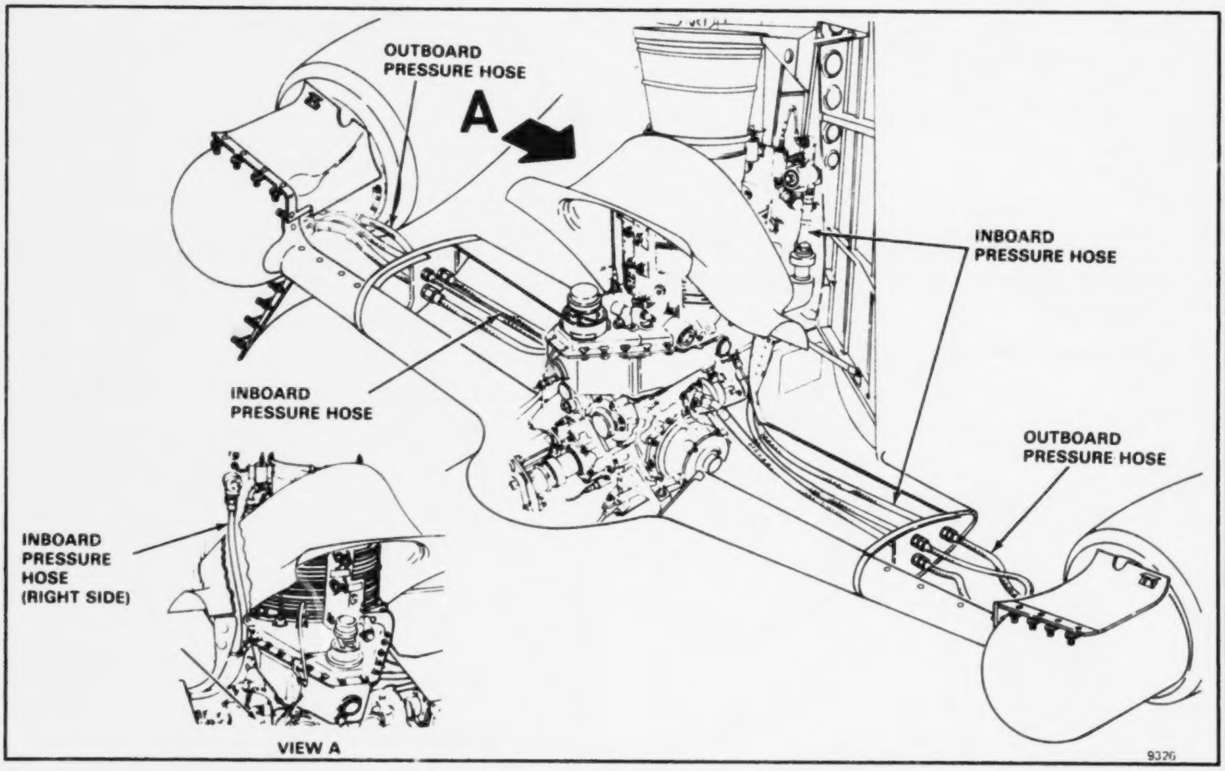
None

***Personnel Required:***

Medium Helicopter Repairer

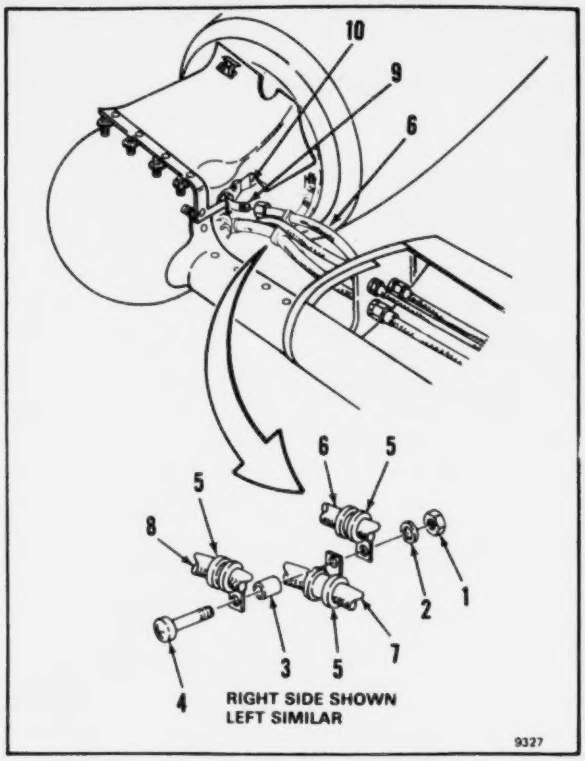
***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Drive Shaft Access Cover Removed (Task 2-2)
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Access Cover Open (Task 2-2)


OUTBOARD PRESSURE HOSE
A
INBOARD PRESSURE HOSE
INBOARD PRESSURE HOSE
OUTBOARD PRESSURE HOSE
INBOARD PRESSURE HOSE (RIGHT SIDE)
VIEW A
9326

GO TO NEXT PAGE

## 6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued) 6-99.3

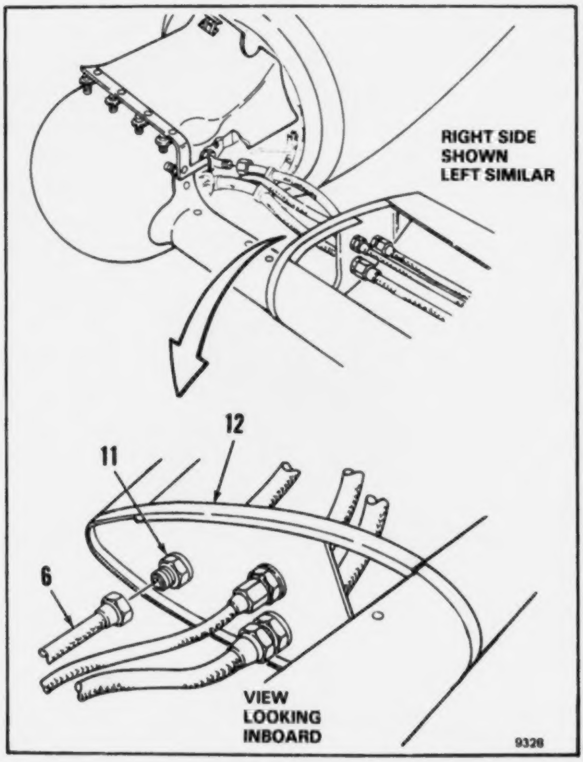

10
9
6
6
5
5
8
2
1
3
5
7
4
RIGHT SIDE SHOWN
LEFT SIMILAR
9327

**NOTE**

Removal of left or right hose assemblies is similar.

***REMOVE OUTBOARD HOSE***

1. **Remove** nut (1), washer (2), spacer (3), and **screw (4)** from clamps (5). Lift pressure hose (6) clear of hoses (7 and 8).
2. **Disconnect pressure hose (6) from reducer (9)** at engine transmission (10). **Support hose** to prevent oil spillage.


RIGHT SIDE
SHOWN
LEFT SIMILAR
12
11
6
VIEW
LOOKING
INBOARD
9328

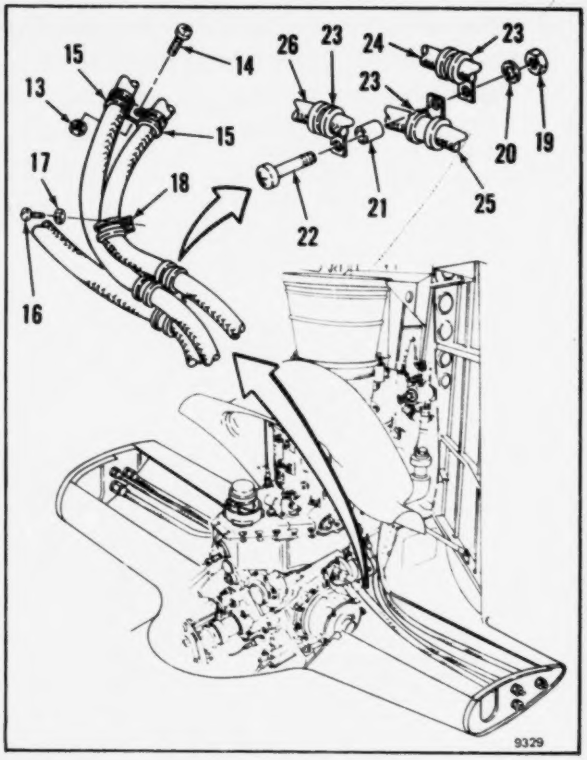
3. **Disconnect pressure hose (6) from union (11)** at bulkhead (12). **Drain oil** into container.
4. **Remove hose (6).**

*GO TO NEXT PAGE*

## 6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued) 6-99.3

*REMOVE INBOARD HOSES*

5. **Remove** nut (13) and **screw (14)** from clamps (15).
6. **Remove screw (16)** and washer (17) from clamp (18).
7. **Remove** nut (19), washer (20), spacer (21), and **screw (22)** from clamps (23). **Lift pressure hose (24) clear** of hoses (25 and 26).


13
14
15
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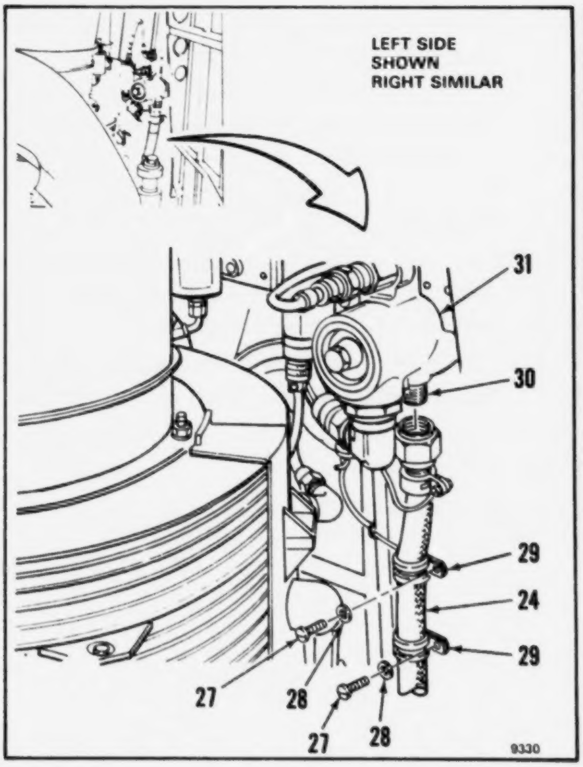
16
17
18
19
20
21
22
23
23
23
24
25
26
9329

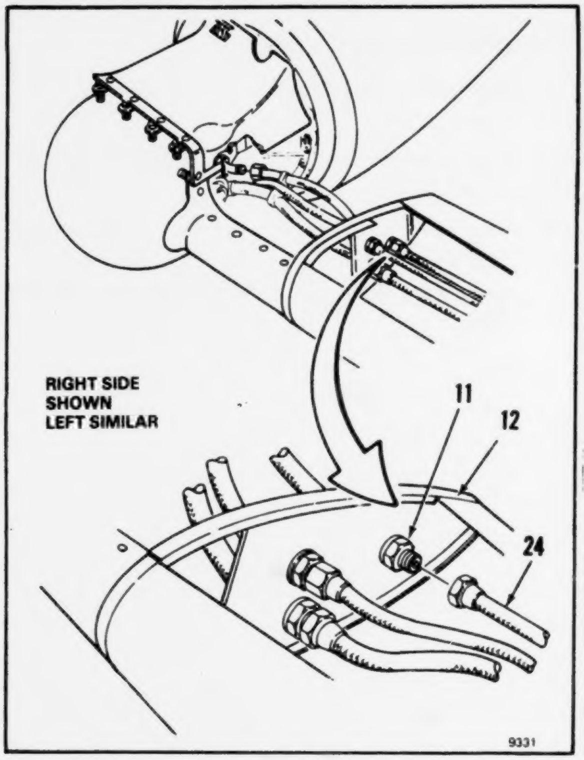
8. **Remove screws (27)** and washers (28) from two clamps (29).
9. **Disconnect hose (24) from reducer (30)** at pressure transmitter (31). **Support hose** to prevent oil spillage.


LEFT SIDE
SHOWN
RIGHT SIMILAR
31
30
29
24
29
27
28
27
28
9330

*GO TO NEXT PAGE*

## 6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued) 6-99.3

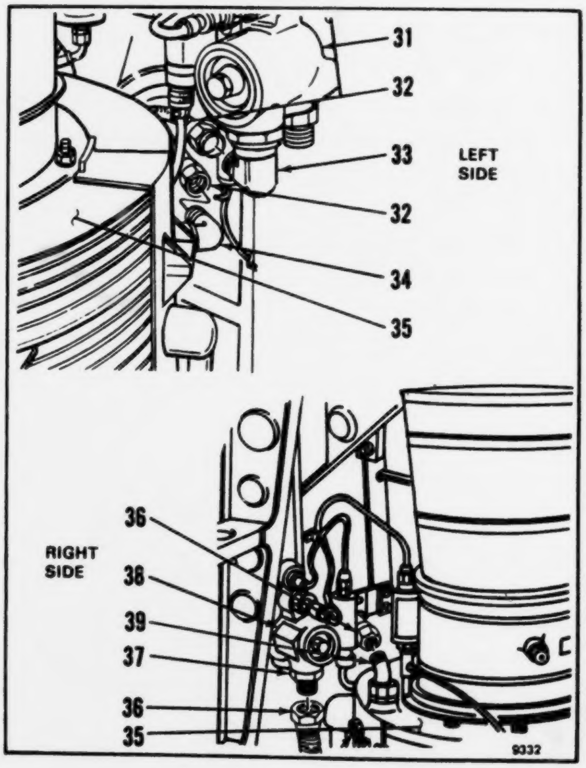
10. **Disconnect hose (24) from union (11)** at bulkhead (12). **Drain oil** into container.
11. Remove hose (24).


RIGHT SIDE
SHOWN
LEFT SIMILAR
11
12
24
9331

12. On left side, disconnect hose (32) from elbow (33) at pressure transmitter (31). Support hose to prevent oil spillage.
13. Disconnect hose (32) from elbow (34) at oil cooler assembly (35). Drain oil into container.
14. Remove hose (32).
15. On right side, disconnect hose (36) from reducer (37) at pressure transmitter (38). Support hose to prevent oil spillage.
16. Disconnect hose (36) from reducer (39) at oil cooler assembly (35). Drain oil into container.
17. Remove hose (36).

FOLLOW-ON MAINTENANCE:

None


31
32
33
LEFT
SIDE
32
34
35
RIGHT
SIDE
36
38
39
37
36
35
9332

**END OF TASK**

## 6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES 6-99.4

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Open End Wrench, 1 1/2-Inch

Open End Wrench, 1 1/8-Inch

***Materials:***

Oil (E253 or E254)

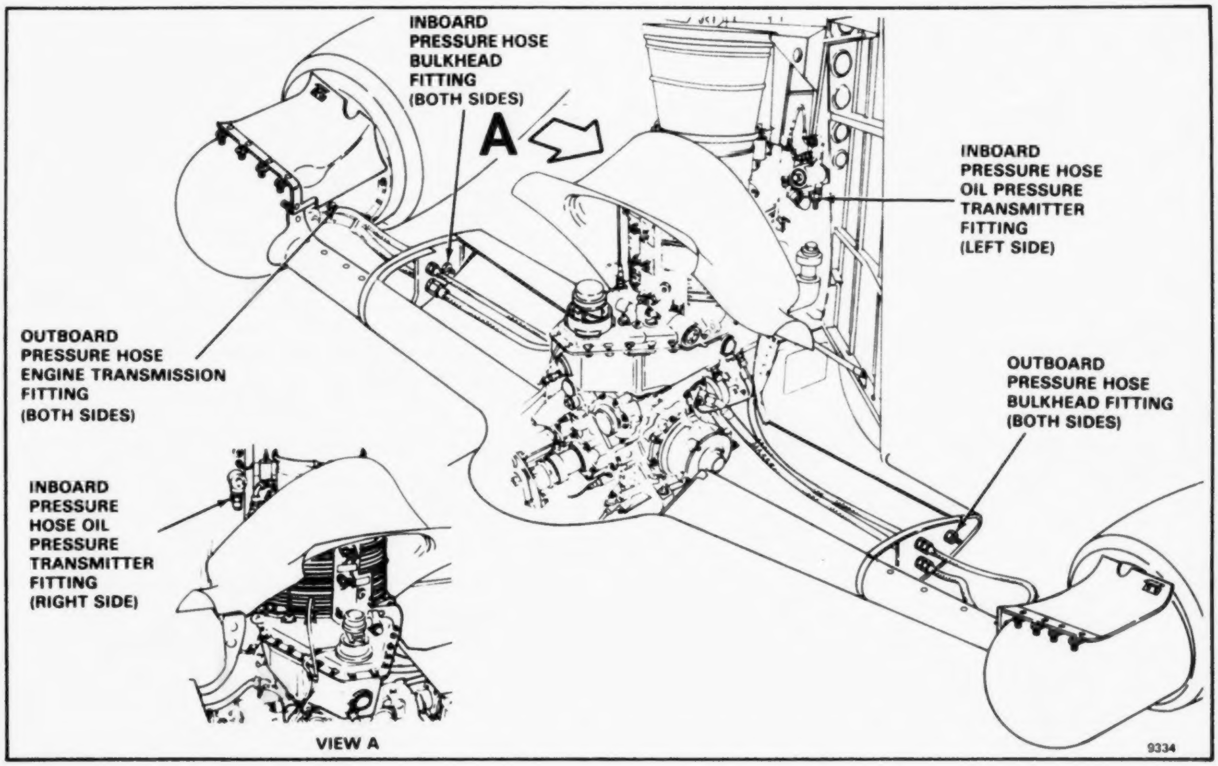
***Personnel Required:***

Medium Helicopter Repairer

Inspector

***References:***

TM 55-1520-240-23P


INBOARD PRESSURE HOSE BULKHEAD FITTING (BOTH SIDES)
A
INBOARD PRESSURE HOSE OIL PRESSURE TRANSMITTER FITTING (LEFT SIDE)
OUTBOARD PRESSURE HOSE ENGINE TRANSMISSION FITTING (BOTH SIDES)
OUTBOARD PRESSURE HOSE BULKHEAD FITTING (BOTH SIDES)
INBOARD PRESSURE HOSE OIL PRESSURE TRANSMITTER FITTING (RIGHT SIDE)
VIEW A
9334

***GO TO NEXT PAGE***

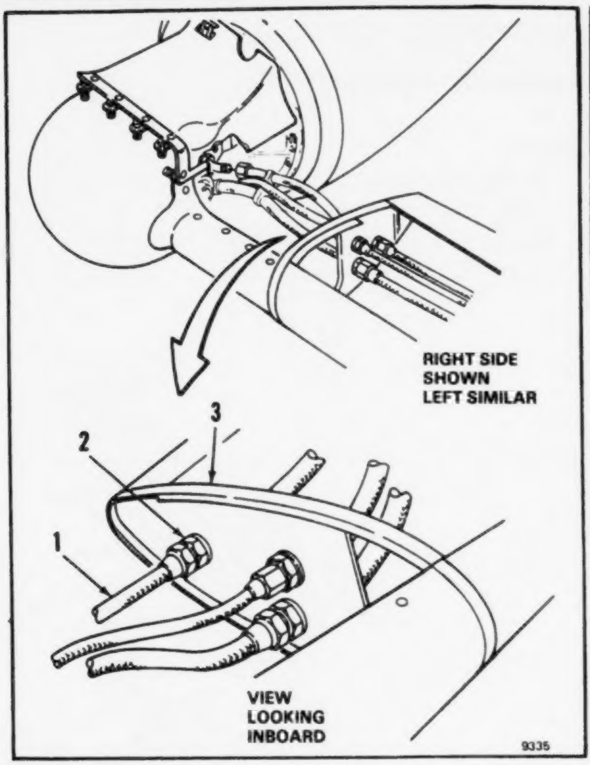
## 6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued) 6-99.4

**NOTE**

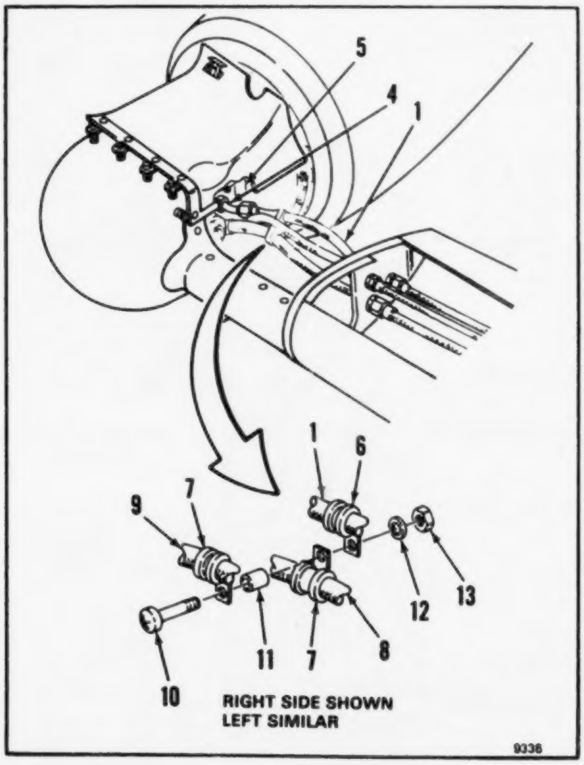
Installation of left or right hose assemblies is similar.

***INSTALL OUTBOARD HOSE***

1. **Coat thread** at ends of hose (1) **with oil (E253 or E254).**
2. **Connect hose (1) to union (2)** at bulkhead (3).


RIGHT SIDE
SHOWN
LEFT SIMILAR
3
2
1
VIEW
LOOKING
INBOARD
9335

3. **Connect hose (1) to reducer (4)** at engine transmission (5).
4. **Align clamp (6)** on pressure hose (1) **with clamp (7)** on hoses (8 and 9). **Install screw (10),** spacer (11), washer (12), and nut (13).

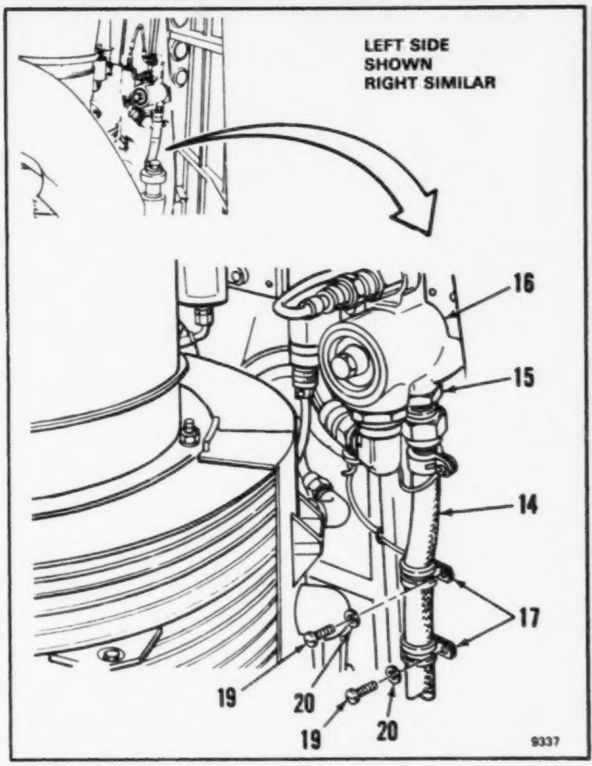

5
4
1
1
6
9
7
12
13
11
7
8
10
RIGHT SIDE SHOWN
LEFT SIMILAR
9336

*GO TO NEXT PAGE*

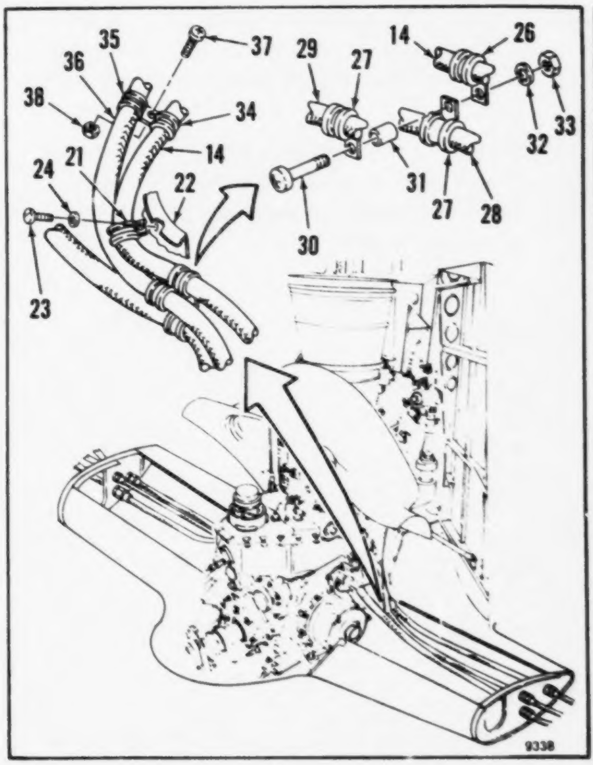
## 6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued) 6-99.4

*INSTALL INBOARD HOSES*

5. **Coat thread** at ends of hose (14) **with oil (E253 or E254).**
6. **Connect hose (14) to reducer (15)** at pressure transmitter (16).
7. **Align two clamps (17)** on pressure hose (14) **with airframe structure (18). Install screws (19)** and washers (20).


LEFT SIDE
SHOWN
RIGHT SIMILAR
16
15
14
17
19
20
19
20
9337

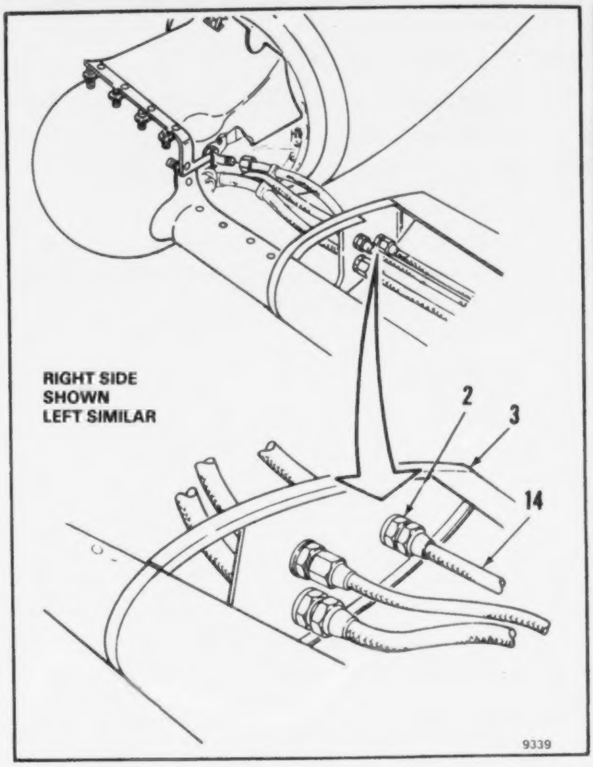
8. **Align clamp (21) on** pressure hose (14) with airframe structure (22). Install screw (23) and washer (24).
9. **Align clamp (26)** on pressure hose (14) **with clamps (27)** on hoses (28 and 29). Install screw (30), spacer (31), washer (32), and nut (33).
10. **Align clamp (34)** on pressure hose (14) **with clamp (35)** on hose (36). **Install screw (37)** and nut (38).


35
36
37
29
27
14
26
38
34
14
24
21
22
31
32
33
27
28
30
23
9338

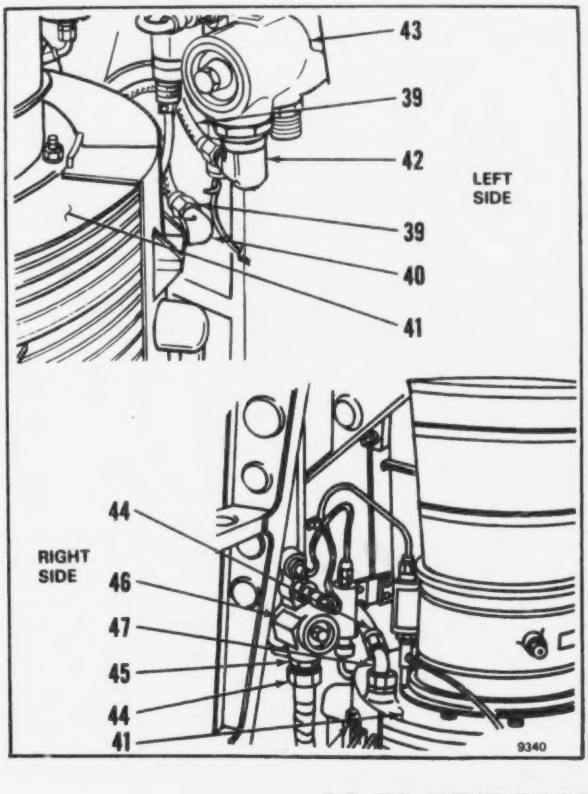
GO TO NEXT PAGE

## 6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued) 6-99.4

11. **Connect hose (14) to union (2)** at bulkhead (3).


RIGHT SIDE
SHOWN
LEFT SIMILAR
2
3
14
9339

12. On left side, **connect hose (39) to elbow (40)** at oil cooler assembly (41). **Connect hose to elbow (42)** at pressure transmitter (43)
13. On right side, **connect hose (44) to reducer (45)** at pressure transmitter (46). **Connect hose to reducer (47)** at oil cooler assembly (41).


43
39
42
LEFT
SIDE
39
40
41
RIGHT
SIDE
44
46
47
45
44
41
9340

GO TO NEXT PAGE

## 6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued) 6-99.4

FOLLOW-ON MAINTENANCE:

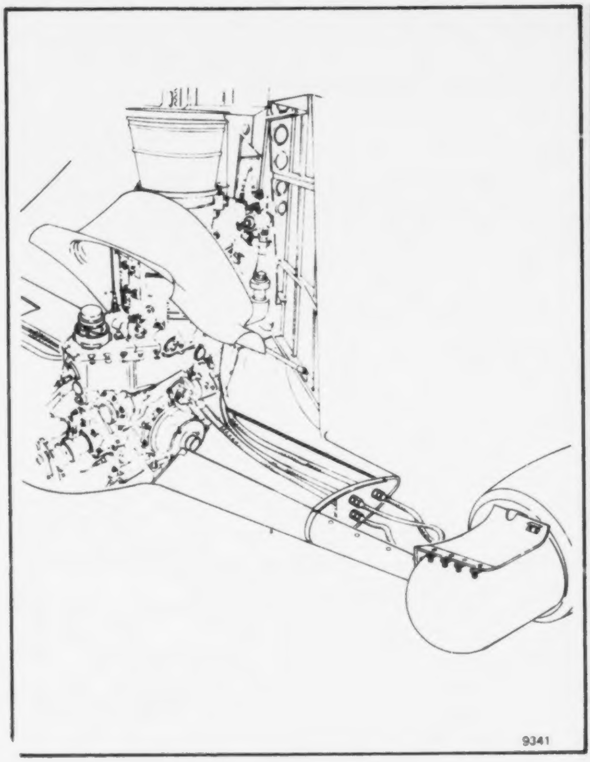
Close engine transmission fairing access covers (Task 2-2).

Install engine air inlet screen (Task 4-76).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).



END OF TASK

## 6-99.5 REMOVE ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES 6-99.5

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Open End Wrench, 1 1/8-Inch

Open End Wrench, 1 1/2-Inch

Container, Two-Quart

***Materials:***

None

***Personnel Required:***

Medium Helicopter Repairer

***Equipment Condition:***

Battery Disconnected (Task 1-39)

Electrical Power Off

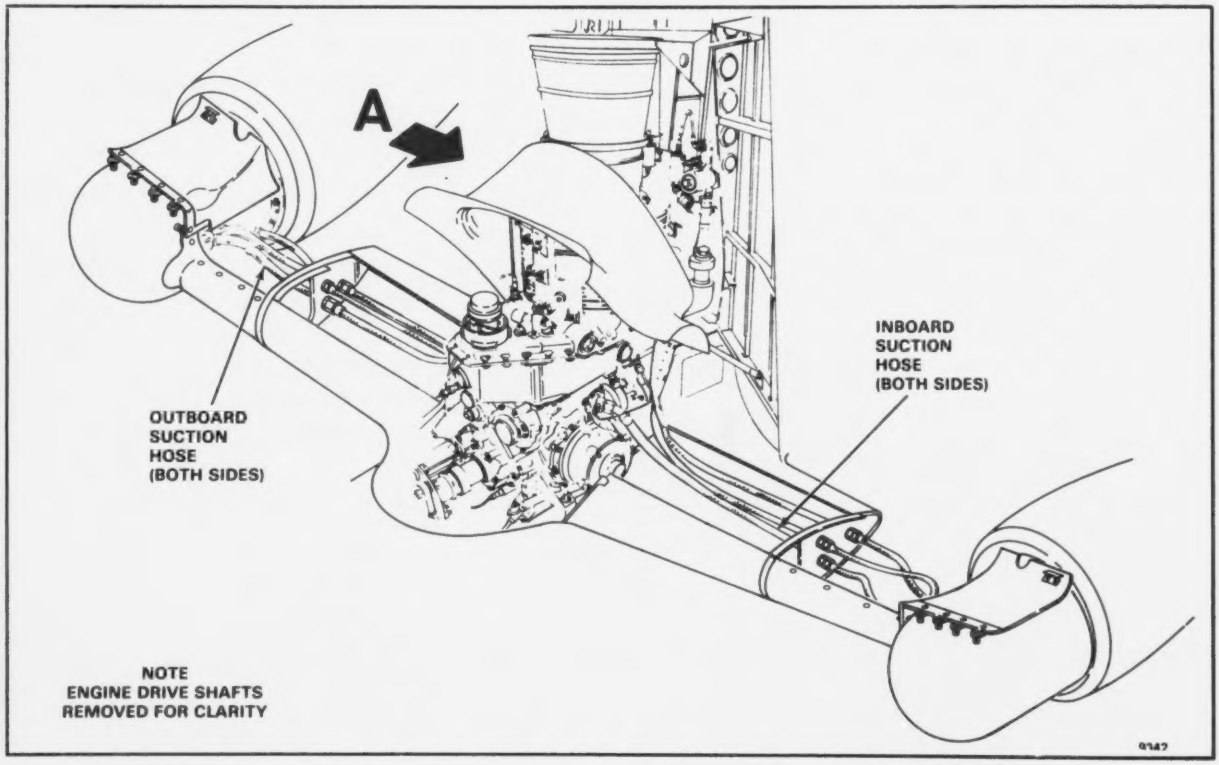
Pylon Access Doors Open (Task 2-2)

Pylon Lower Fairing Open (Task 2-2)

Engine Drive Shaft Access Cover Removed (Task 2-2)

Engine Air Inlet Screens Removed (Task 4-65)

Engine Transmission Fairing Access Cover Open (Task 2-2)


A
OUTBOARD SUCTION HOSE (BOTH SIDES)
INBOARD SUCTION HOSE (BOTH SIDES)
9342

NOTE
ENGINE DRIVE SHAFTS REMOVED FOR CLARITY

GO TO NEXT PAGE

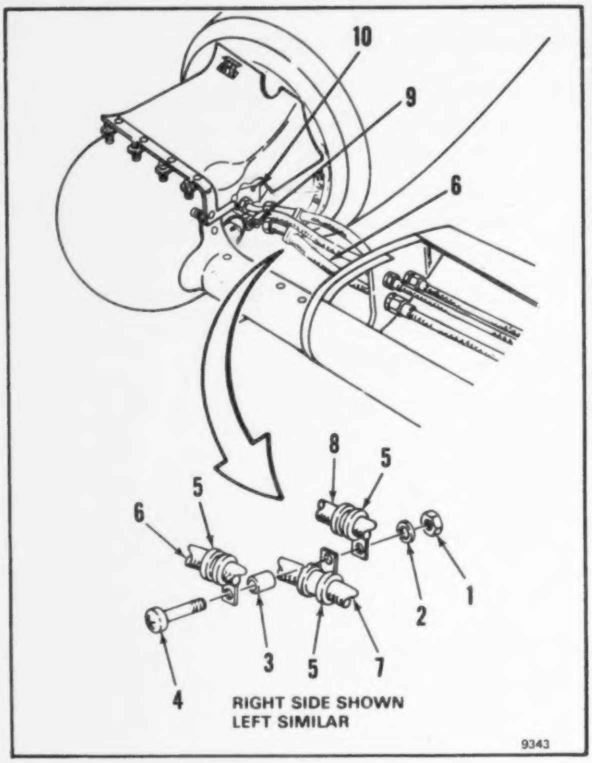
## 6-99.5 REMOVE ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued) 6-99.5

**NOTE**

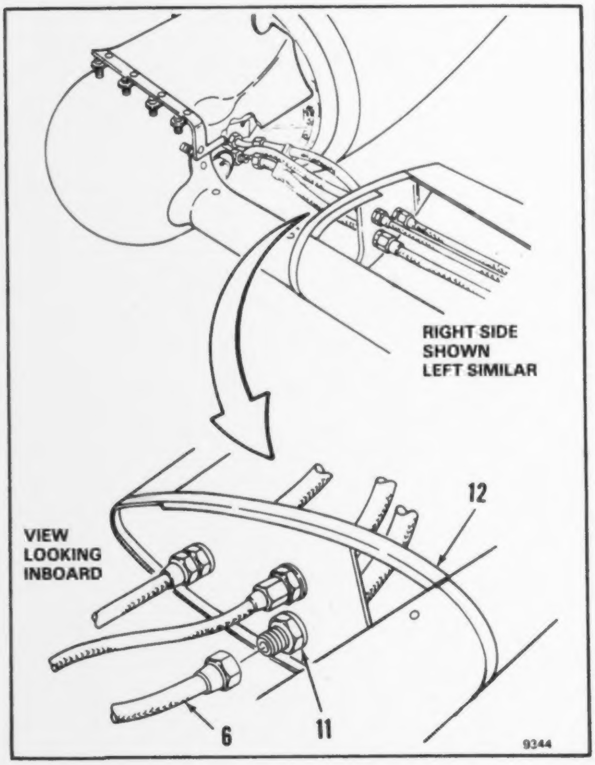
Removal of left or right hose assembly is similar.

***REMOVE OUTBOARD HOSE***

1. **Remove** nut (1), washer (2), spacer (3), and screw (4) from **clamp (5). Lift suction hose (6) clear of hoses (7 and 8).**
2. **Disconnect suction hose (6) from reducer (9)** at engine transmission (10). Support hose to prevent oil spillage.


10
9
6
8
5
5
6
1
2
3
5
7
4
RIGHT SIDE SHOWN
LEFT SIMILAR
9343

3. **Disconnect suction hose (6) from union (11)** at bulkhead (12). Drain oil into container.
4. Remove hose (6).


RIGHT SIDE
SHOWN
LEFT SIMILAR
12
VIEW
LOOKING
INBOARD
6
11
9344

*GO TO NEXT PAGE*

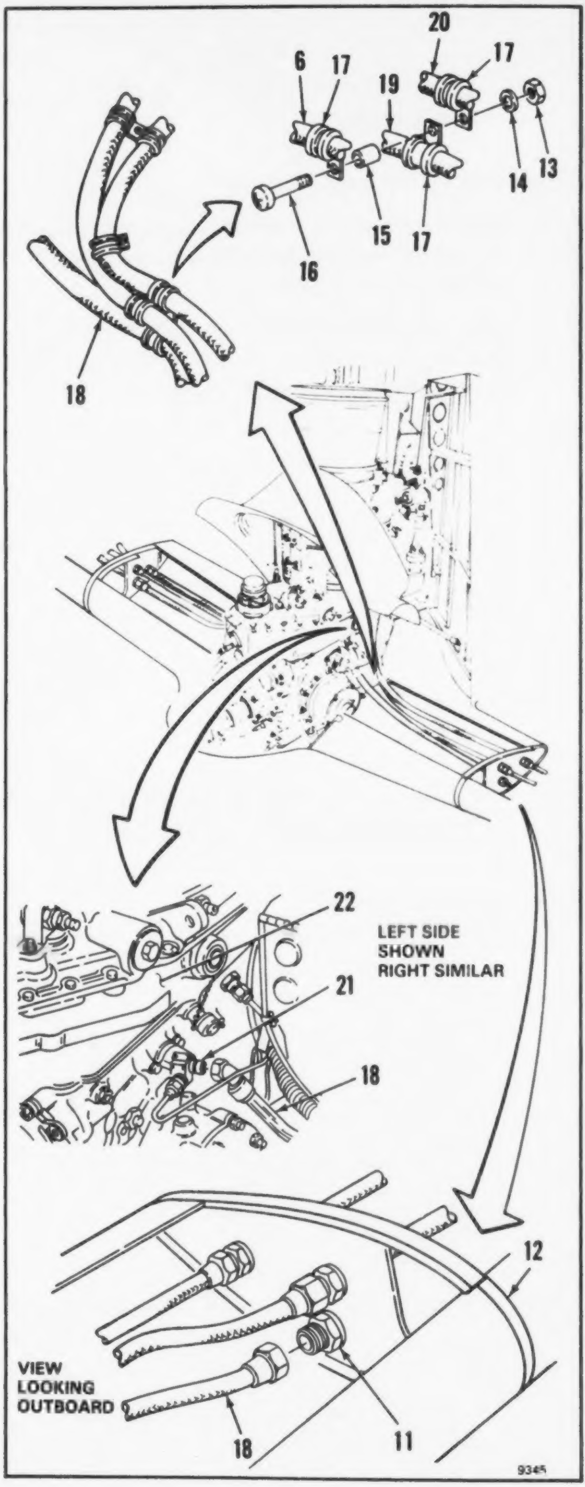
## 6-99.5 REMOVE ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued) 6-99.5

***REMOVE INBOARD HOSE***

5. **Remove** nut (13), washer (14), spacer (15) and **screw (16)** from clamps (17). Lift suction hose (18) clear of hoses (19 and 20).
6. **Disconnect hose (18) from debris detection screen (21)** at combining transmission (22).
7. **Disconnect hose (18) from union (11)** at bulkhead (12).
8. **Remove hose (18).**

FOLLOW-ON MAINTENANCE:

None


20
6
17
17
19
13
14
15
17
16
18
22
LEFT SIDE
SHOWN
RIGHT SIMILAR
21
18
12
VIEW
LOOKING
OUTBOARD
18
11
9345

END OF TASK

## 6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES 6-99.6

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Open End Wrench, 1 1/8-Inch

Open End Wrench, 1 1/2-Inch

***Materials:***

Oil (E253 or E254)

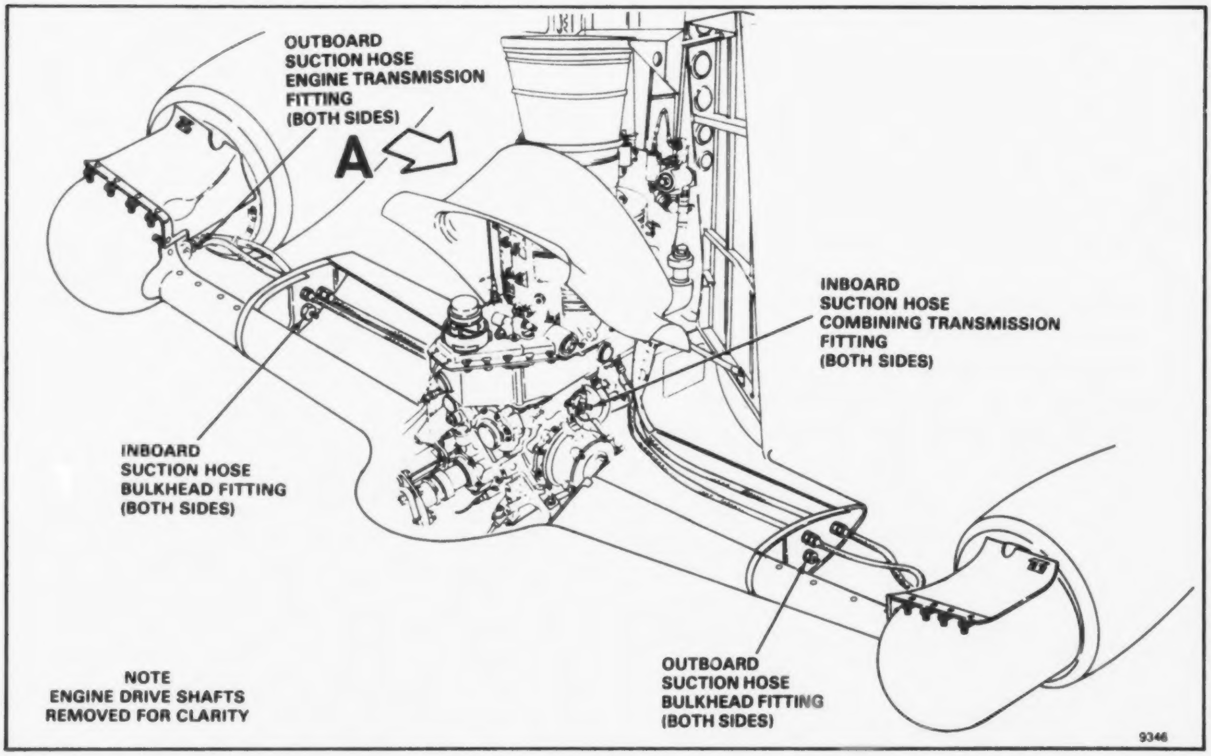
***Personnel Required:***

Medium Helicopter Repairer

Inspector

***References:***

TM 55-1520-240-23P


OUTBOARD SUCTION HOSE ENGINE TRANSMISSION FITTING (BOTH SIDES)
A
INBOARD SUCTION HOSE COMBINING TRANSMISSION FITTING (BOTH SIDES)
INBOARD SUCTION HOSE BULKHEAD FITTING (BOTH SIDES)
NOTE ENGINE DRIVE SHAFTS REMOVED FOR CLARITY
OUTBOARD SUCTION HOSE BULKHEAD FITTING (BOTH SIDES)
9346

***GO TO NEXT PAGE***

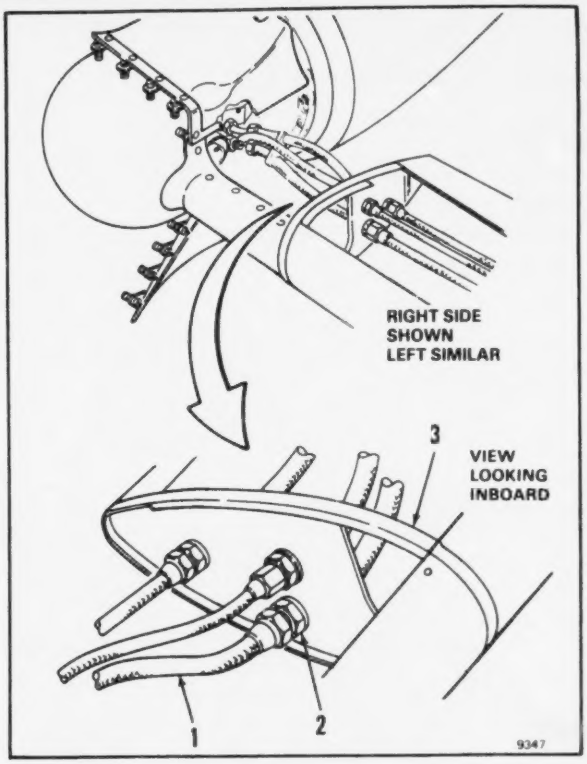
## 6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued) 6-99.6

**NOTE**

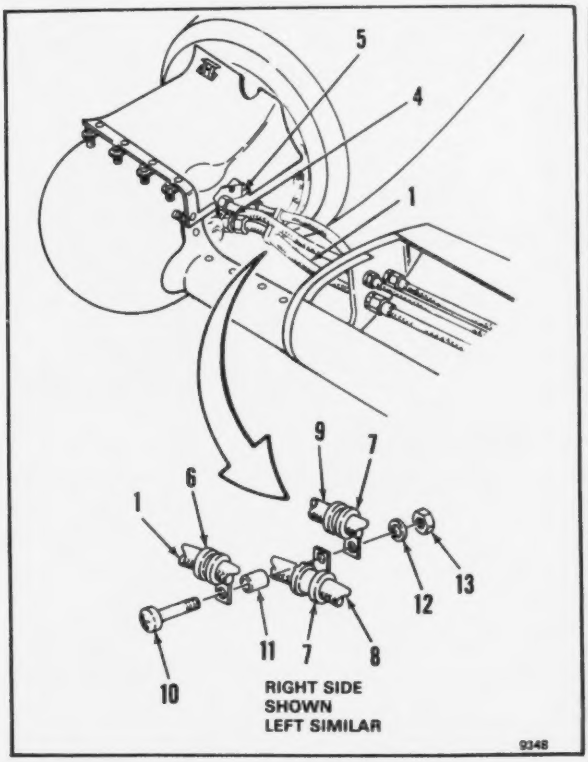
Installation of left or right hose assemblies is similar.

***INSTALL OUTBOARD HOSE***

1. **Coat thread at ends of hose (1) with oil (E253 or E254).**
2. **Connect hose (1) to union (2)** at bulkhead (3).


RIGHT SIDE
SHOWN
LEFT SIMILAR
3
VIEW
LOOKING
INBOARD
1
2
9347

3. **Connect hose (1) to reducer (4)** at engine transmission (5).
4. **Align clamp (6)** on suction hose (1) **with clamps (7)** on hoses (8 and 9). **Install screw (10),** spacer (11), washer (12) and nut (13).


5
4
1
9
7
6
1
13
12
11
7
8
10
RIGHT SIDE
SHOWN
LEFT SIMILAR
9348

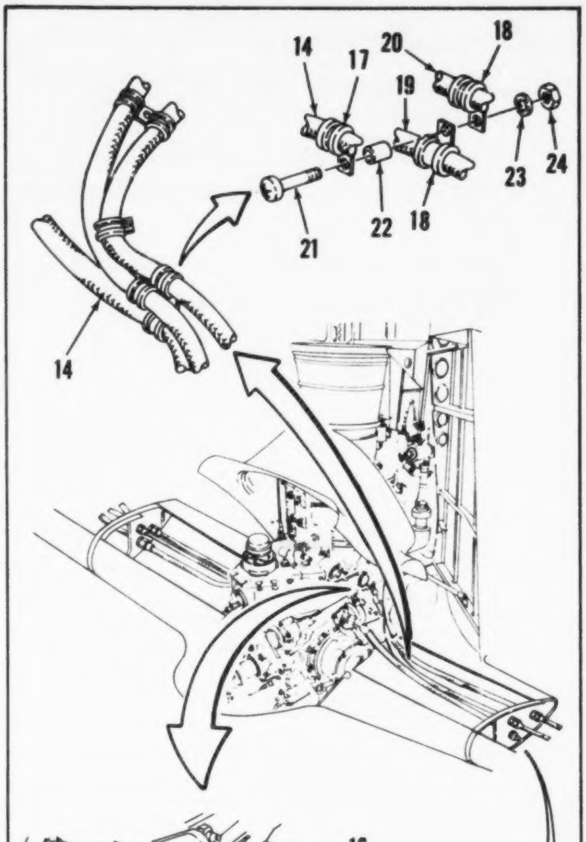
GO TO NEXT PAGE

## 6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued) 6-99.6

***INSTALL INBOARD HOSE***

5. **Coat thread at ends of hose (14) with oil (E253 or E254).**
6. **Connect hose (14) to union (2)** at bulkhead (3).
7. **Connect hose (14) to debris detection screen (15)** at combining transmission (16).
8. **Align clamp (17)** on suction hose (14) **with clamps (18)** on hoses (19 and 20). **Install screw (21),** spacer (22), washer (23), and nut (24).

***INSPECT***


14
17
20
18
19
23
24
21
22
18
14
16
15
14
LEFT SIDE SHOWN RIGHT SIMILAR
3
VIEW LOOKING OUTBOARD
14
2
9349

**GO TO NEXT PAGE**

## 6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES (Continued) 6-99.6

FOLLOW-ON MAINTENANCE:

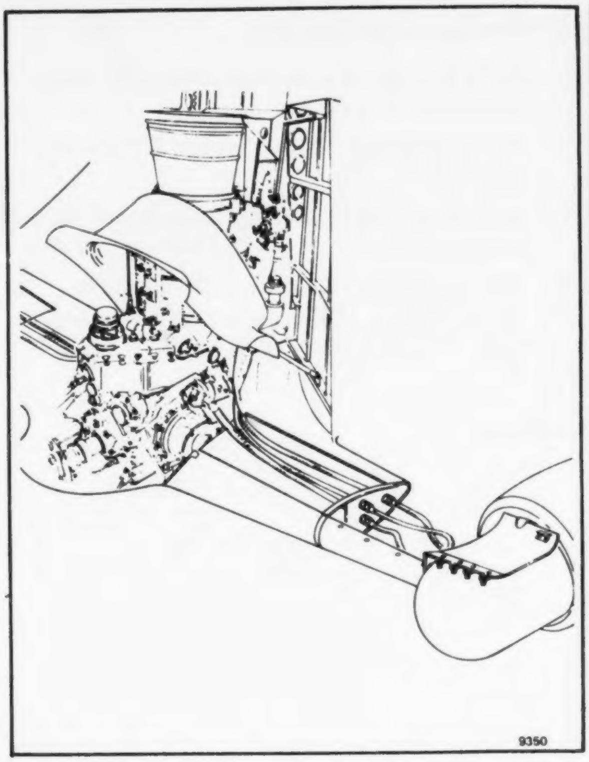
Close engine transmission fairing access cover (Task 2-2).

Install engine air inlet screen (Task 4-76).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).



END OF TASK

## 6-100 REMOVE ENGINE TRANSMISSION 6-100

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, Two Quart
Sling (T3)
Hoist
Open End Wrench, 1 1/4-Inch
Open End Wrench, 1 1/2-Inch
Rope Guide Line
Padded Support

***Materials:***

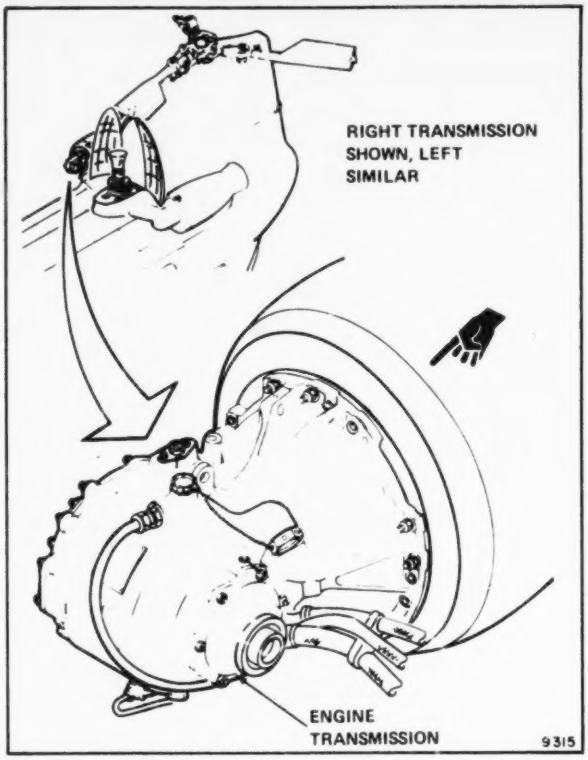
Cloths (E120)

***Personnel Required:***

Medium Helicopter Repairer (2)

***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)
Pylon Hinged Fairing Open (Task 2-2)
Engine Drive Shaft and Engine Transmission Adapter Assembly Removed (Task 6-30)


RIGHT TRANSMISSION SHOWN, LEFT SIMILAR
ENGINE TRANSMISSION
9315

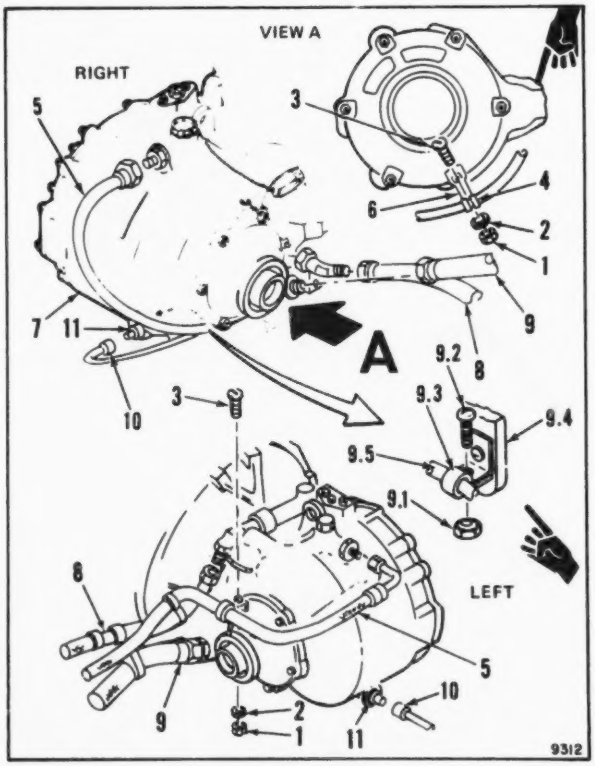
### NOTE

Procedure is similar to remove left or right transmission. Right transmission is shown here. Differences are noted in steps.

1. **Remove** nut (1), washers (2), and screw (3) from **clamp (4)** connecting hose (5) to clip (6).
2. **Disconnect hose (5)** from transmission (7).
3. **Disconnect two oil hoses (8 and 9)** from transmission (7). Drain oil into container.

3.1. Remove nut (9.1) and screw (9.2) from clamp (9.3) at lower lifting lug (9.4). Release temperature and chip detector wire (9.5).

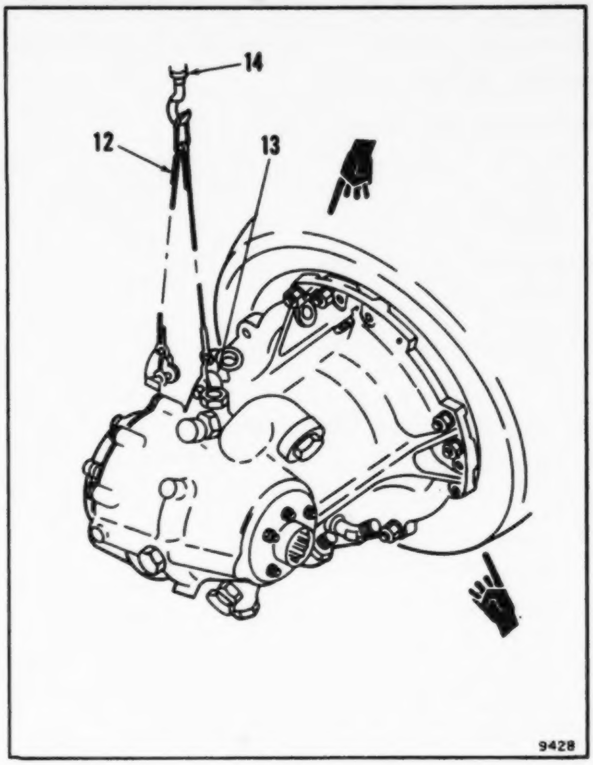
4. **Disconnect connector (10)** from temperature and chip detector (11).


VIEW A
RIGHT
5
3
4
6
2
1
9
7
11
A
9.2
8
10
3
9.3
9.4
9.5
9.1
LEFT
8
5
10
9
2
1
11
9312

GO TO NEXT PAGE

## 6-100 REMOVE ENGINE TRANSMISSION (Continued) 6-100

5. **Connect sling (T3) (12)** to lifting lug (13). Connect hoist hook (14) to sling (T3).
6. Have helper raise hoist hook (14) to **take up slack in sling (T3) (12).** Do not apply tension to sling.



7. Attach guide line (15) around transmission (7).
8. Remove eight nuts (16) and washers (17) from studs (18). Discard nuts.

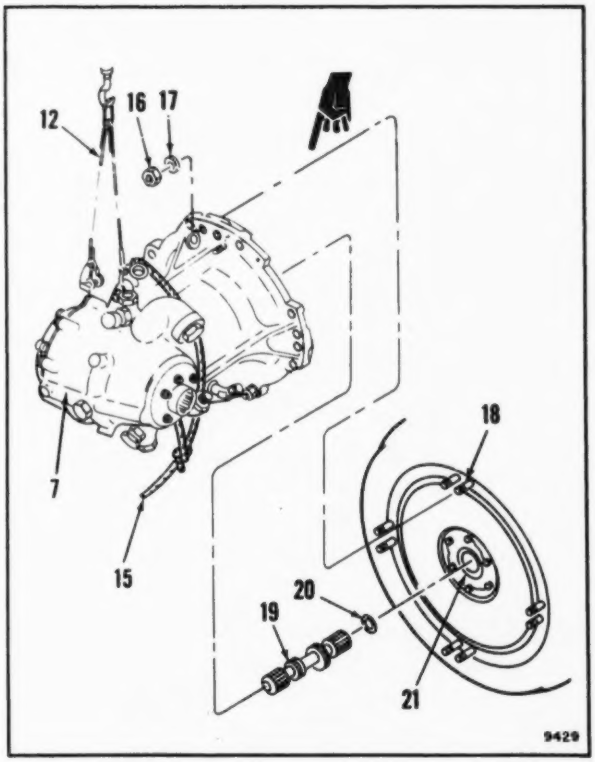
**WARNING**

**Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.**

9. **Remove transmission (7)** from studs (18) and quill shaft (19). Lower transmission to padded support. Remove sling (T3) (12).
10. **Remove quill shaft (19).** Remove packing (20) from engine (21).
11. Wipe up spilled oil. Use cloths (E120).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-101 INSPECT ENGINE TRANSMISSION QUILL SHAFT 6-101

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

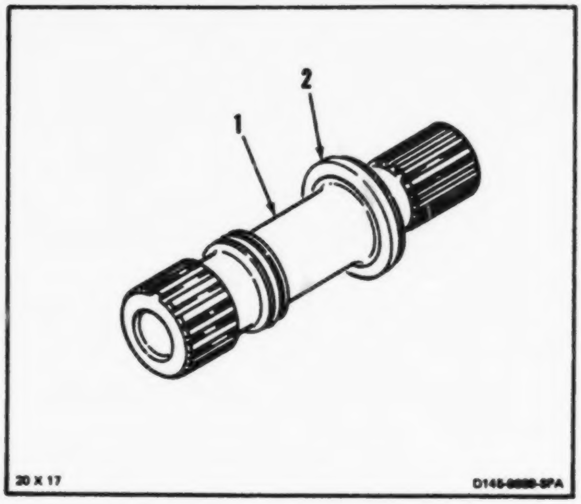
***Materials:***
None

***Personnel Required:***
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Off Helicopter Task

1. **Visually check quill shaft (1)** for cracks, chipping, erosion of plating, or distortion. There shall be no such damage.
2. **Inspect snubber (2)** for tears, holes, or erosion. There shall be no such damage.



FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-102 DISASSEMBLE (TEAR DOWN) ENGINE TRANSMISSION 6-102

INITIAL SETUP

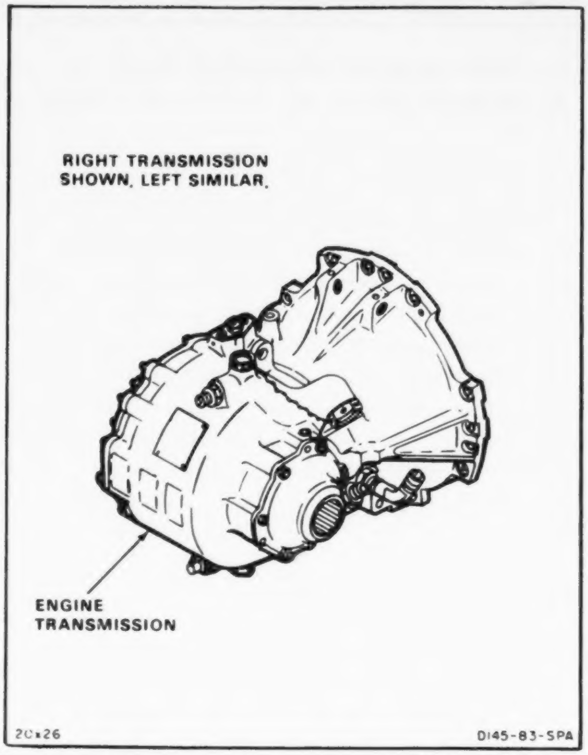
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

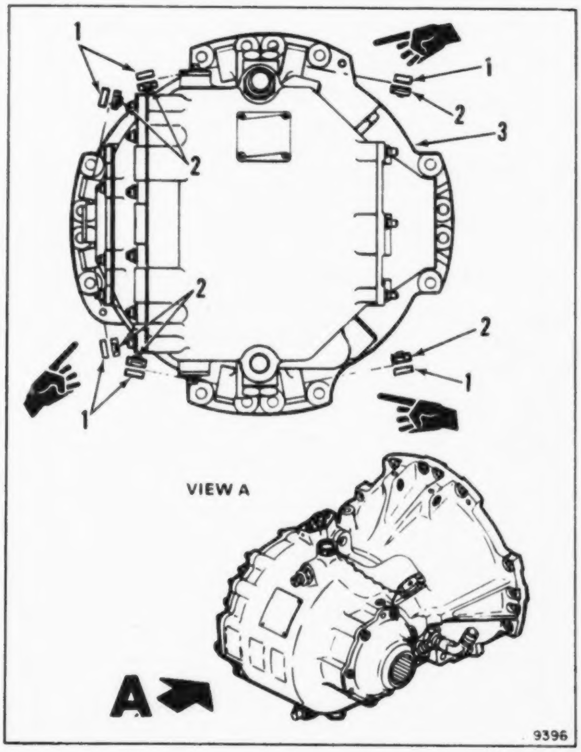
***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Off Helicopter Task


RIGHT TRANSMISSION
SHOWN, LEFT SIMILAR.
ENGINE
TRANSMISSION
20x26
D145-83-SPA

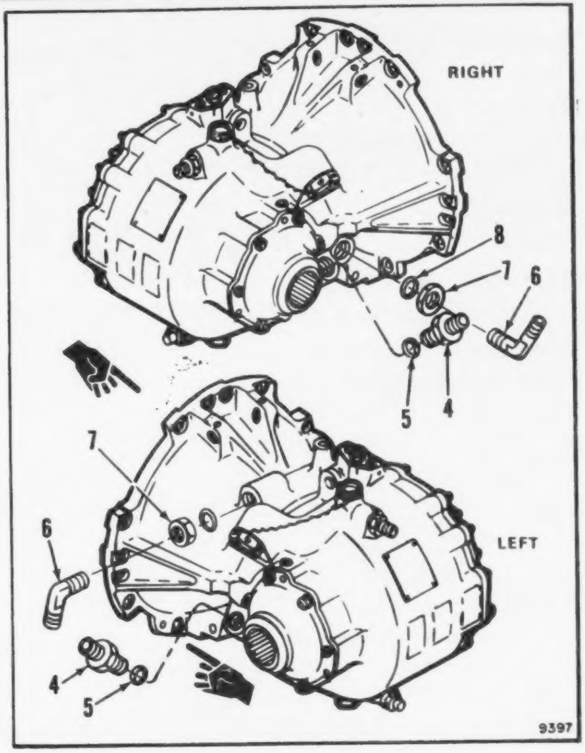
1. **Check that six barrel nuts (1) and retainers (2) are secure in transmission (3) and properly aligned.**


1
1
2
3
2
2
2
1
1
VIEW A
A
9396

*GO TO NEXT PAGE*

## 6-102 DISASSEMBLE (TEAR DOWN) ENGINE TRANSMISSION (Continued) 6-102

2. **Remove union (4)** and packing (5).
3. **Remove elbow (6),** nut (7), and packing (8).


RIGHT
8
7
6
5
4
7
6
LEFT
4
5
9397

FOLLOW-ON MAINTENANCE:

None

END OF TASK

## 6-102.1 REPAIR ENGINE TRANSMISSION OUTSIDE SURFACE 6-102.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Depth Gage 643J
Goggles

***Materials:***
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer
68D30 Inspector

***References:***
TM 43-0103
MIL-M-3171, Type VI
MIL-C-22751

***Equipment Condition:***
Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

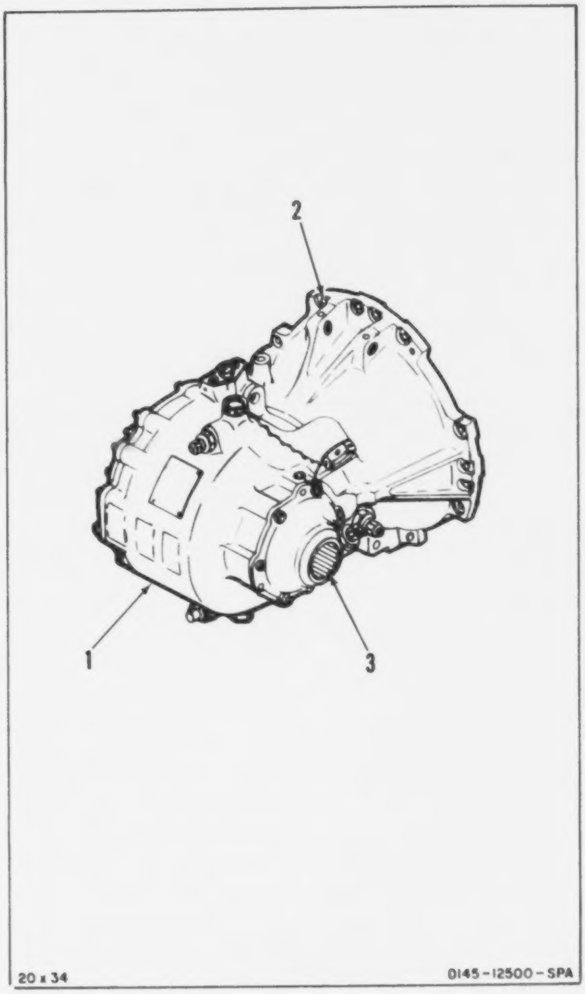
**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

***GO TO NEXT PAGE***

## 6-102.1 REPAIR ENGINE TRANSMISSION OUTSIDE SURFACE (Continued) 6-102.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.



1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on housing (1).

   **NOTE**

   Limits in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**

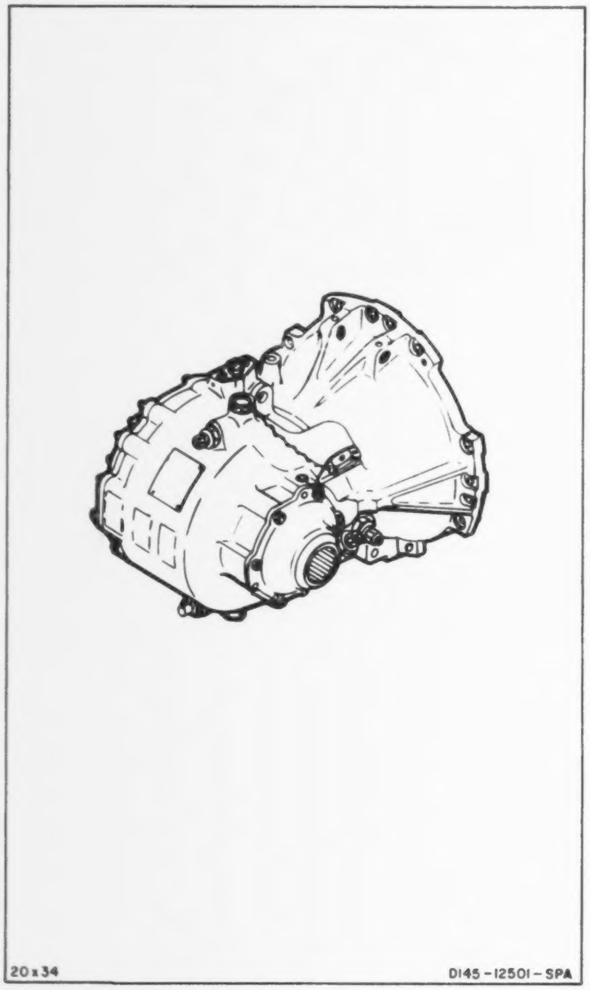
   b. **Damage shall not extend over more than one surface or enter any radius.**

   c. **Damage shall not be closer than 1.00 inch to any mounting hole (3).**
3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. Cover output splines (3) near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.

***GO TO NEXT PAGE***

## 6-102.1 REPAIR ENGINE TRANSMISSION OUTSIDE SURFACE (Continued) 6-102.1

6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. **Acid etch reworked area** as follows:
   a. Prepare a solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.
   b. Swab area with solution for 2 minutes. Use gauze sponges (E184).
   c. Rinse area with cold water.
8. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
9. Apply surface treatment to reworked area as follows:
   a. **Clean area with naphtha (E245)** and clean cloths. Wear gloves (E186). Let area air dry.
   b. **Swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, type VI). Swab until metal becomes dull gold to brown.** Use gauze sponges (E184). **Rinse** area with cold water and let air dry.
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.
11. **Apply epoxy topcoat (E166)** (MIL-C-22751).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-103 PREPARE ENGINE TRANSMISSION FOR SHIPMENT OR STORAGE 6-103

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Handling Sling (T3)
Work Hoist
Shipping Container (T38)

***Materials:***

Fingerprint Remover (E175)
Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Swabbing Brush (E86)
Corrosion Preventive Compound (E153 or E154)
Barrier Material (E81)
Masking Tape (E388)
Desiccant (E160), 16-Unit Bag (9)
Tarpaulin (E410) or Plastic Sheet (E279)

***Personnel Required:***

Medium Helicopter Repairer (2)
Inspector

***References:***

TB 55-8100-200-25

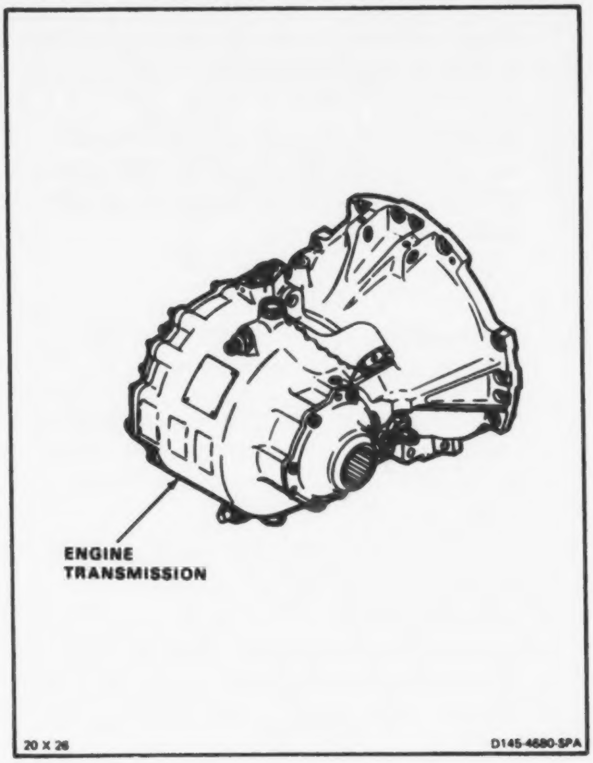
***Equipment Condition:***

Off Helicopter Task
Transmission Disassembled (Task 6-102)

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



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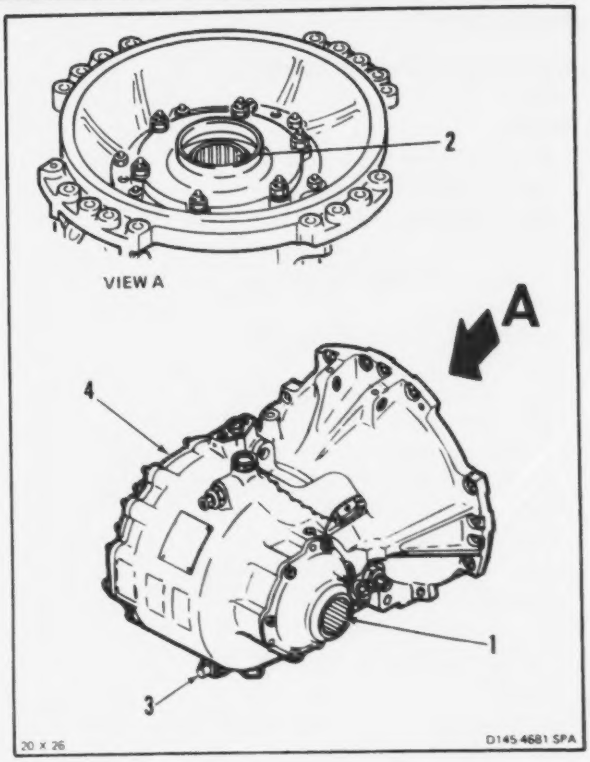
## 6-103 PREPARE ENGINE TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-103

1. **Clean splines (1 and 2).** Use clean cloths (E120) damp with fingerprint remover (E175). Wear gloves (E186).
2. **Remove film** left by fingerprint remover with clean cloths (E120) damp with solvent (E162). Use goggles for eyes. Dry splines with clean dry cloths.

**CAUTION**

**Touching splines with bare fingers can cause corrosion.**

3. **Coat splines (1 and 2)** with corrosion preventive compound (E153) or E154). Wear gloves (E186) and use swabbing brush (E86).
4. **Cover splines (1 and 2) and electrical receptacle (3).** Use barrier material (E81) and tape (E388).
5. **Clean outside of transmission (4).** Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



**NOTE**

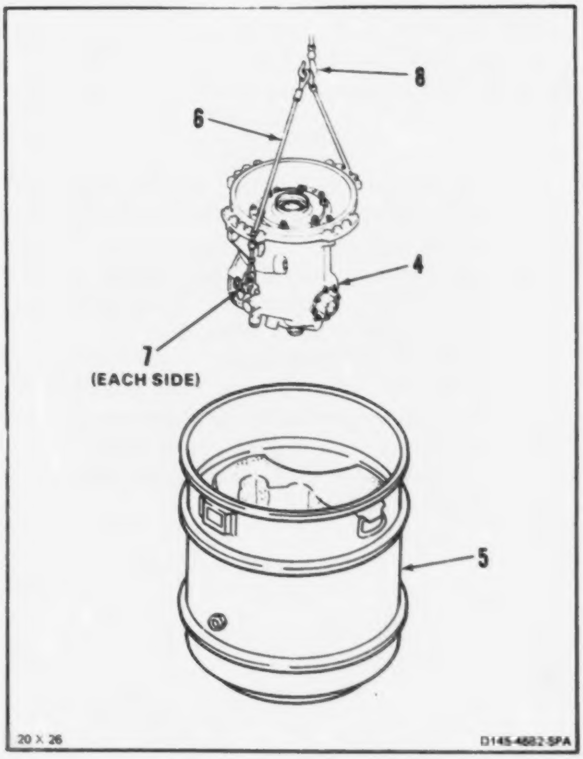
If shipping container is not available, go to step 7.

6. **Install transmission in shipping container (T38) (5)** as follows:
   a. Inspect and prepare container (T38) (5) (TB 55-8100-200-25).
   b. Install sling (T3) (6) on lugs (7). Connect hoist (8) to sling.

**NOTE**

Have helper guide transmission into container.

   c. Lift transmission (4) into container (T38) (5). Remove sling (6).
   d. Put nine 16-unit bags of desiccant (E160) in container (T38) (5).



GO TO NEXT PAGE

## 6-103 PREPARE ENGINE TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-103

**NOTE**

Transmission is supported in container by molded cushioning. No mounting bolts are needed.

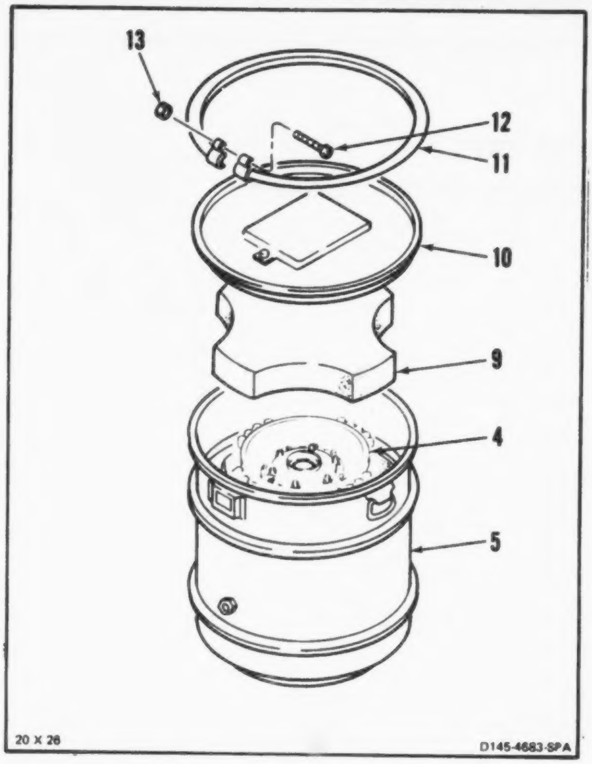
e. Install cushioning material (9) over transmission (4) in container (T38) (5).

f. Install cover (10) and ring (11). Secure with bolt (12) and nut (13).

g. Go to FOLLOW-ON MAINTENANCE.

**NOTE**

Bag is only for short-term storage. Install transmission in shipping container (T38) as soon as possible.

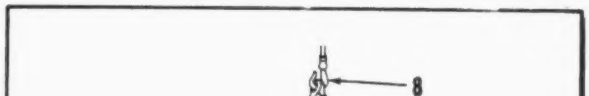


7. If shipping container (T38) is not available, make storage bag (14). Use barrier material (E81) and tape (E388). Make bag about 40 inches high and 60 inches around.
8. Install sling (T3) (6) on lugs (7). Connect hoist (8) to sling.

**NOTE**

Have helper guide transmission into bag.

9. Lift transmission (4) into bag (14). Remove sling (6).
10. Put **nine 16-unit bags of desiccant (E160) in bag (14).** Seal bag with tape (E388).
11. Store transmission (4) indoors, if possible. If stored outdoors, keep transmission off ground. Cover with tarpaulin (E410) or plastic sheet (E279).



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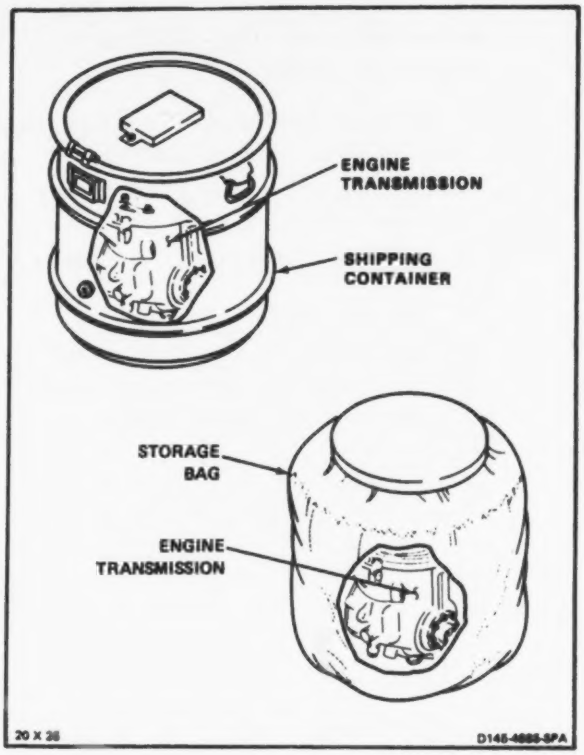
## 6-103 PREPARE ENGINE TRANSMISSION FOR SHIPMENT OR STORAGE (Continued) 6-103

***INSPECT***

FOLLOW-ON MAINTENANCE:

None


ENGINE TRANSMISSION
SHIPPING CONTAINER
STORAGE BAG
ENGINE TRANSMISSION
20 X 35
D145-4665-5PA

**END OF TASK**

## 6-104 REMOVE ENGINE TRANSMISSION FROM STORAGE 6-104

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4962

Handling Sling (T3)

Work Hoist

***Materials:***

Dry Cleaning Solvent (E162)

Cloths (E120)

Gloves (E186)

***Personnel Required:***

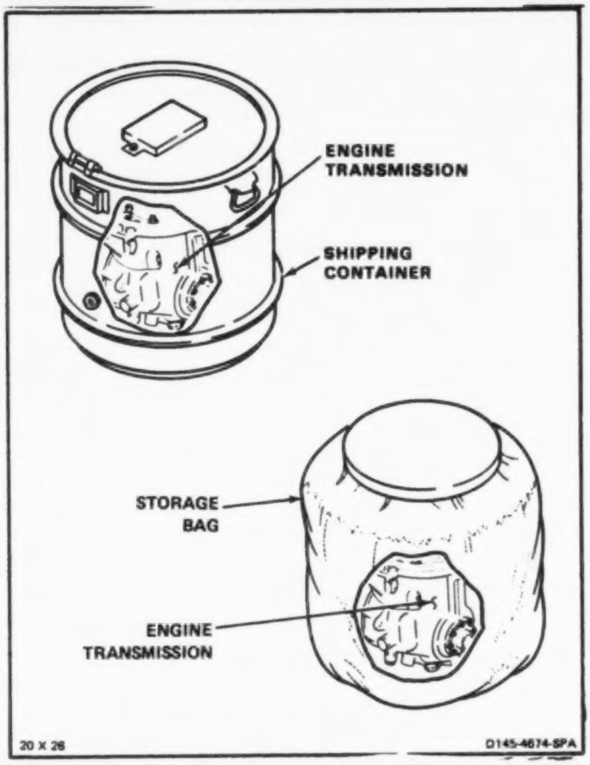
Medium Helicopter Repairer (2)

Inspector

***Equipment Condition:***

Off Helicopter Task

Engine Transmission Prepared for Shipment or Storage (Task 6-103)


ENGINE TRANSMISSION
SHIPPING CONTAINER
STORAGE BAG
ENGINE TRANSMISSION
20 X 26
D145-4674-SPA

**NOTE**

If transmission is stored in storage bag, do steps 1, 3, and 4. If transmission is stored in shipping container, do steps 2 thru 4.

1. **Remove transmission (1) from storage bag (2)** as follows:

   a. **Cut open bag (2).** Remove and discard desiccant bags.

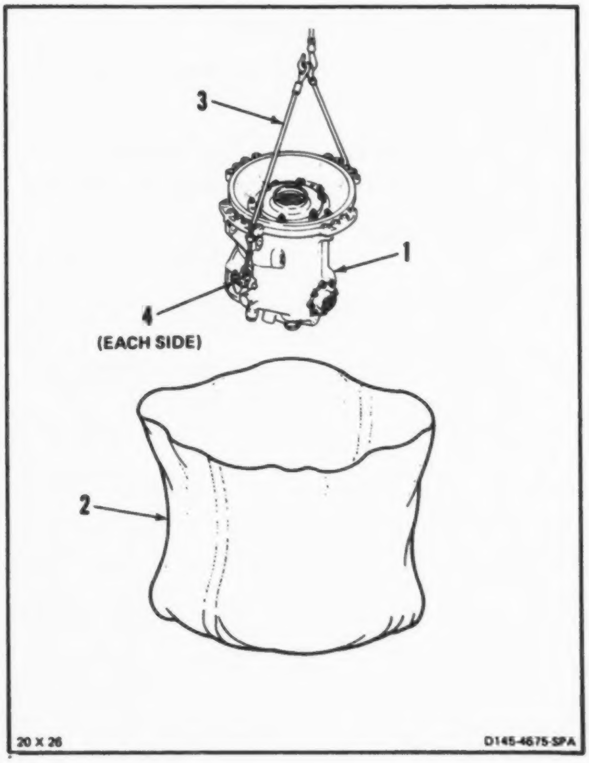
   b. **Install sling (T3) (3)** on lugs (4). Using work hoist, carefully lift transmission (1) from bag (2).

   **NOTE**

   Have helper guide transmission when removing from bag.

   c. Set transmission (1) down on bench or workstand. Remove sling (3) from lugs (4).

   d. Go to step 3.


3
1
4
(EACH SIDE)
2
20 X 26
D145-4675-SPA

GO TO NEXT PAGE

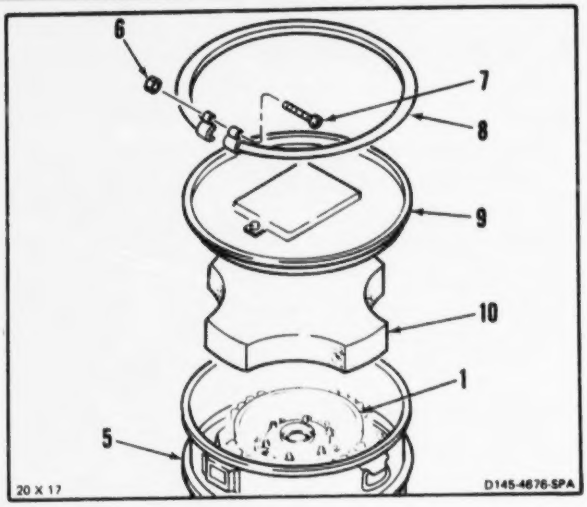
## 6-104 REMOVE ENGINE TRANSMISSION FROM STORAGE (Continued) 6-104

2. **Remove transmission (1) from shipping container (T38) (5)** as follows:

   a. Remove nut (6) and bolt (7) from ring (8). Remove ring and cover (9) from container (5).

   b. Remove cushioning material (10).

   c. Remove and discard desiccant bags.


6
7
8
9
10
1
5
20 X 17
D145-4676-SPA

**NOTE**

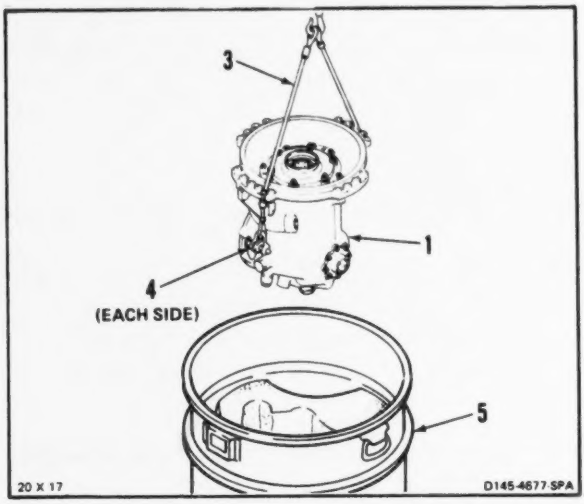
Have helper guide transmission when removing from storage.

   d. Install sling (T3) (3) on lugs (4). Using work hoist, carefully lift transmission (1) from container (T38) (5).

**NOTE**

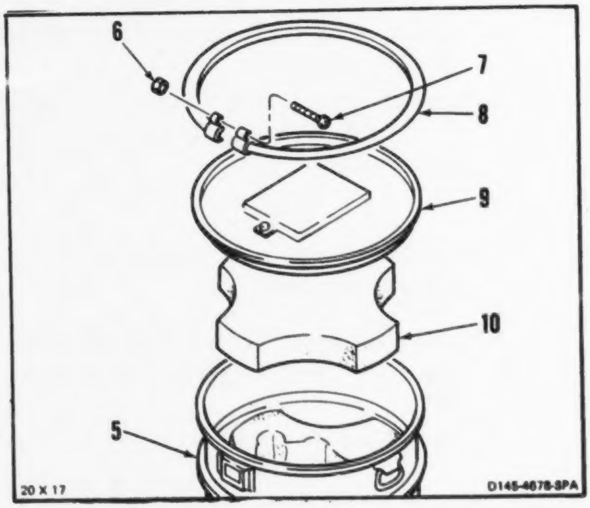
Have helper guide transmission when removing from storage.

   e. Set transmission down on bench or workstand. Remove sling (3) from lugs (4).


3
1
4
(EACH SIDE)
5
20 X 17
D145-4677-SPA

   f. Insert cushioning material (10) in container (T38) (5).

   g. Install cover (9) and ring (8). Secure with bolt (7) and nut (6).


6
7
8
9
10
5
20 X 17
D145-4678-SPA

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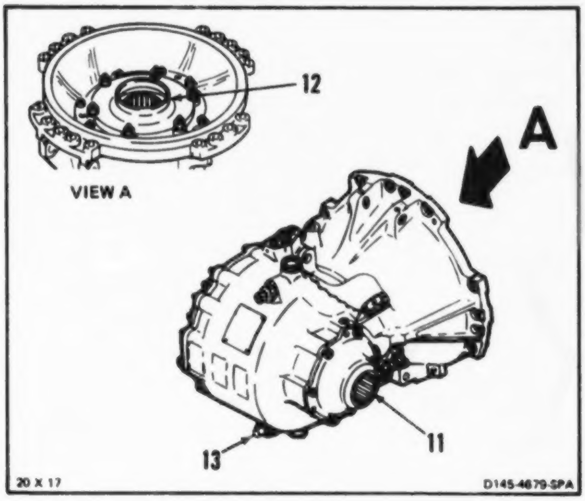
## 6-104 REMOVE ENGINE TRANSMISSION FROM STORAGE (Continued) 6-104

3. Remove barrier material from splines (11 and 12) and electrical connector (13).



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Touching splines with bare fingers can cause corrosion.**

4. **Remove corrosion-preventive compound** from splines (11 and 12). Use cloth (E120) damp with solvent (E162). Wear gloves (E186) and goggles.

***INSPECT***

FOLLOW-ON MAINTENANCE:

Assemble (build up) transmission (Task 6-105 or 6-106).

**END OF TASK**

## 6-105 ASSEMBLE (BUILD UP) LEFT ENGINE TRANSMISSION 6-105

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Source of Low-Pressure Compressed Air

***Materials:***

Dry Cleaning Solvent (E162)

Cloths (E120)

Gloves (E186)

***Parts:***

Preformed Packings

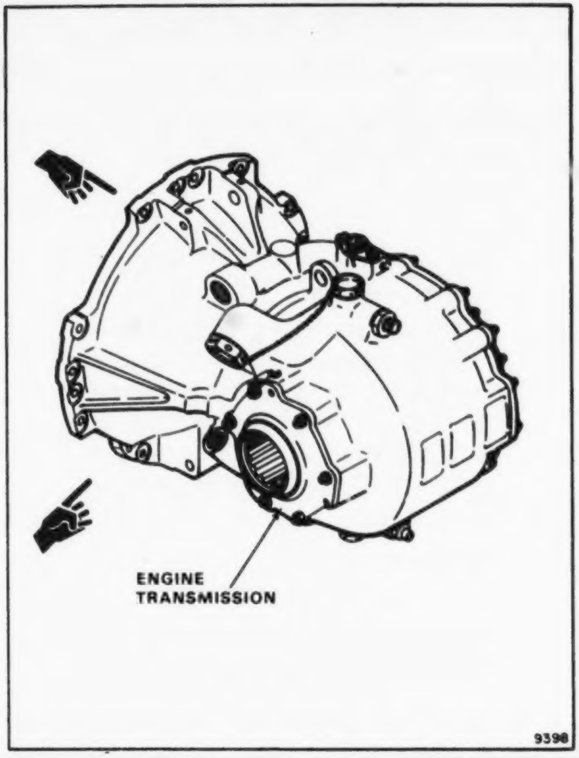
***Personnel Required:***

Medium Helicopter Repairer

Inspector

***References:***

TM 55-1520-240-23P

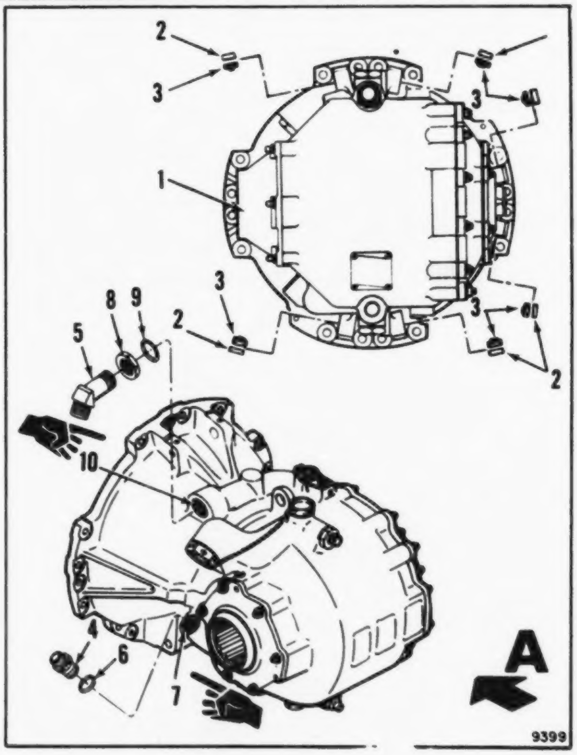


1. Position transmission with output shaft (1) facing left.
2. **Check that barrel nuts (2) and retainers (3) are securely installed.**

**WARNING**

**Dry cleaning solvent (E162) is flammable and gives off toxic fumes. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

3. Clean union (4) and elbow (5). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry with low pressure compressed air.
4. **Install union (4)** and packing (6) in port (7).
5. Install nut (8) on elbow (5). **Install elbow** and packing (9) in port (10), with elbow pointing down.



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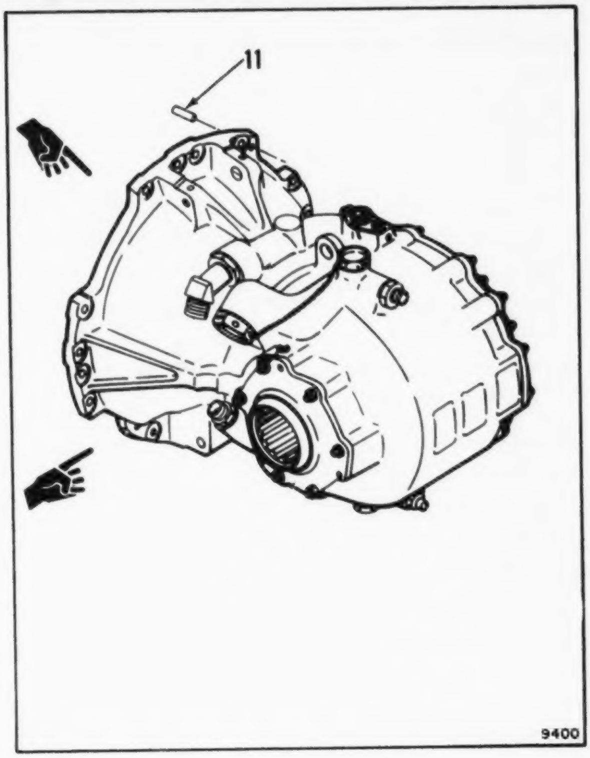
## 6-105 ASSEMBLE (BUILD UP) LEFT ENGINE TRANSMISSION (Continued) 6-105

6. Install dowel pin (11).

***INSPECT***



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-106 ASSEMBLE (BUILD UP) RIGHT ENGINE TRANSMISSION 6-106

INITIAL SETUP

***Applicable Configurations:***
All

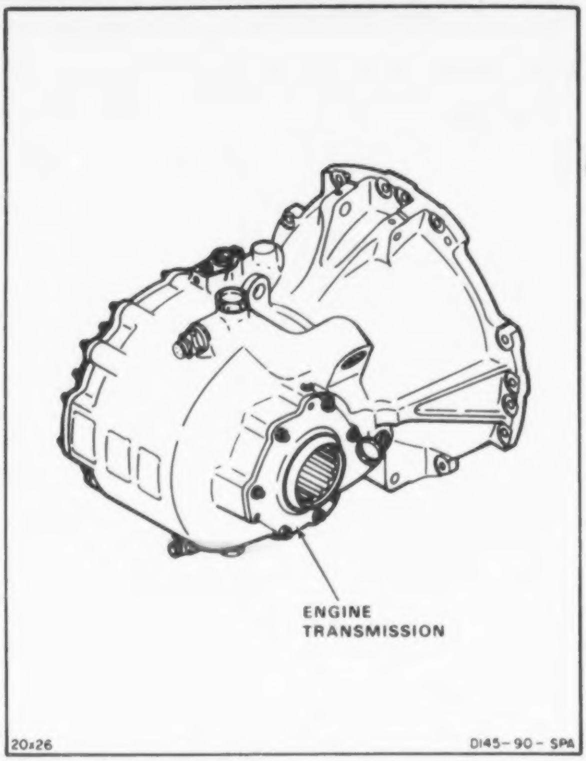
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Source of Low-Pressure Compressed Air

***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Lockwire (E231)
Gloves (E186)

***Parts:***
Preformed Packings

***Personnel Required:***
Medium Helicopter Repairer
Inspector

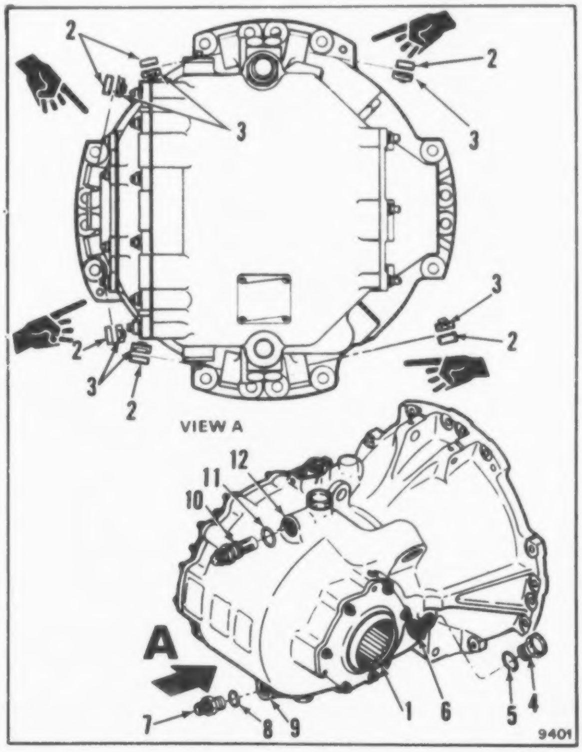
***References:***
TM 55-1520-240-23P



**NOTE**

New or rebuilt transmissions are received as left. If a left transmission is received, but a right transmission is being installed, perform steps 1. thru 5. Otherwise begin with step 6.

1. Position transmission with output shaft (1) facing right.
2. **Check that barrel nuts (2) and retainers (3) are securely installed.**
3. Remove lockwire from plug (4). **Remove plug** and packing (5) from port (6).
4. **Remove union (7)** and packing (8) from port (9).
5. **Remove chip detector (10)** and packing (11) from port (12).



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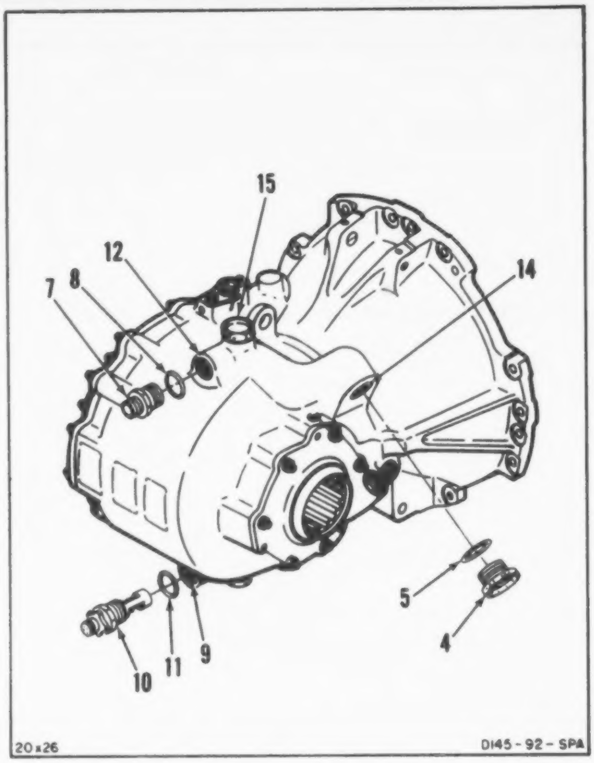
## 6-106 ASSEMBLE (BUILD UP) RIGHT ENGINE TRANSMISSION (Continued) 6-106

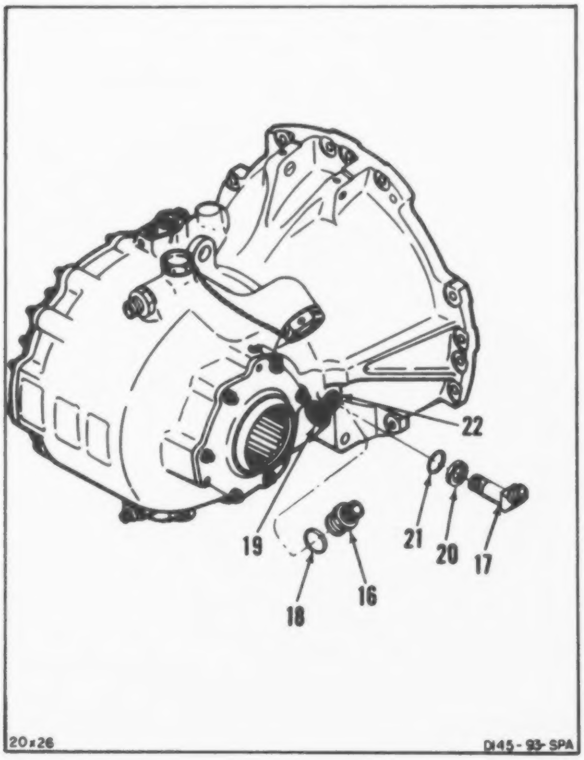
6. **Install reducer (7)** and packing (8) in port (12). **Torque reducer to 90 inch-pounds.**
7. **Install chip detector (10)** and packing (11) in port (9). **Torque chip detector to 90 inch-pounds.** Lockwire chip detector to plug (13) with lockwire (E231).
8. **Install plug (4)** and packing (5) in port (14). Lockwire plug (4) to plug (15) with lockwire (E231).



**WARNING**

**Dry cleaning solvent (E162) is flammable and gives off toxic fumes. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

9. Clean union (16) and elbow (17). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry with low pressure compressed air.
10. **Install union (16)** and packing (18) in port (19).
11. Install nut (20) on elbow (17). **Install elbow** and packing (21). in port (22) with elbow pointing up.



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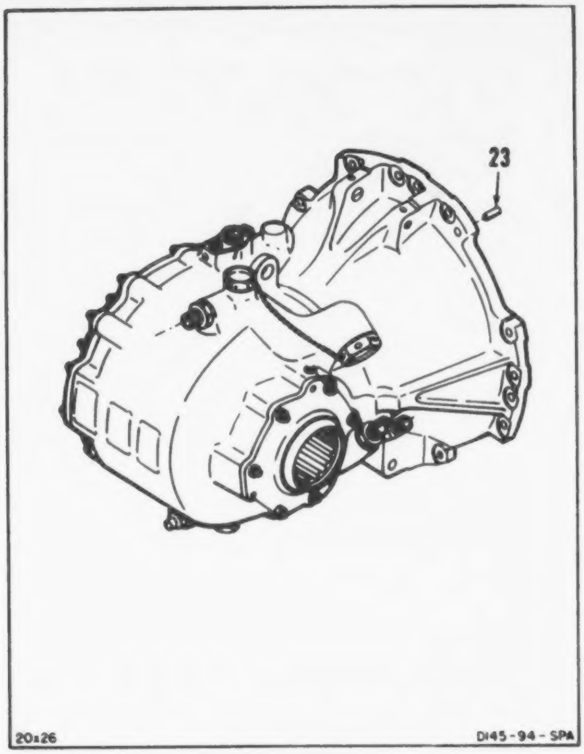
## 6-106 ASSEMBLE (BUILD UP) RIGHT ENGINE TRANSMISSION (Continued) 6-106

12. **Install pin (23).**


23
20126
D145-94-SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-107 INSTALL ENGINE TRANSMISSION 6-107

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Sling (T34)
Hoist
Open End Wrench, 1 1/4-Inches
Open End Wrench, 1 1/2-Inches
Rope Guide Line

***Materials:***

Oil (E254)

***Parts:***

Packing

***Personnel Required:***

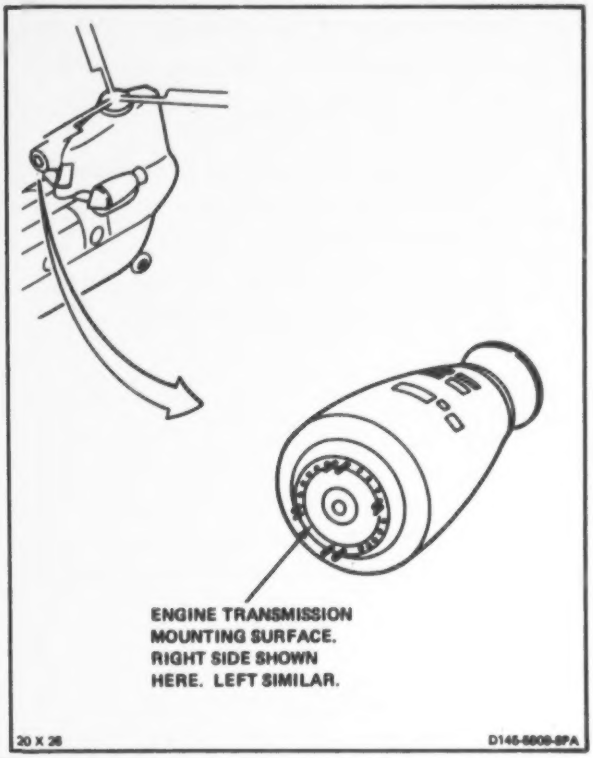
Medium Helicopter Repairer (2)
Inspector

***References:***

TM 55-1520-240-23P

***Equipment Condition:***

Engine Transmission Quill Shaft Inspected (Task 6-101)


ENGINE TRANSMISSION MOUNTING SURFACE. RIGHT SIDE SHOWN HERE. LEFT SIMILAR.
20 X 26
D145-8809-8PA

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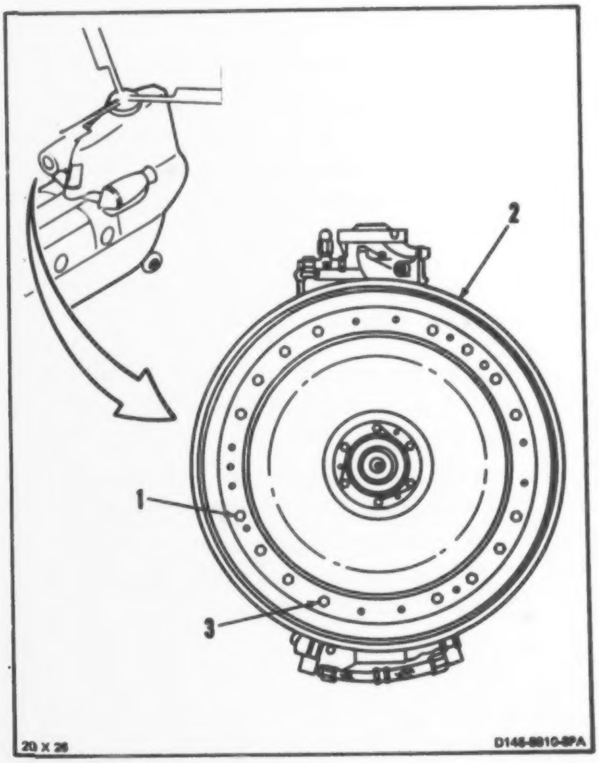
**NOTE**

Procedure is similar to install left or right transmission. Right transmission is shown here. Differences are noted in steps.

1. **On right installation, check that bolt (1) is removed from engine (2). On left installation, check that bolt (3) is removed.**


2
1
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D145-8810-8PA

*GO TO NEXT PAGE*

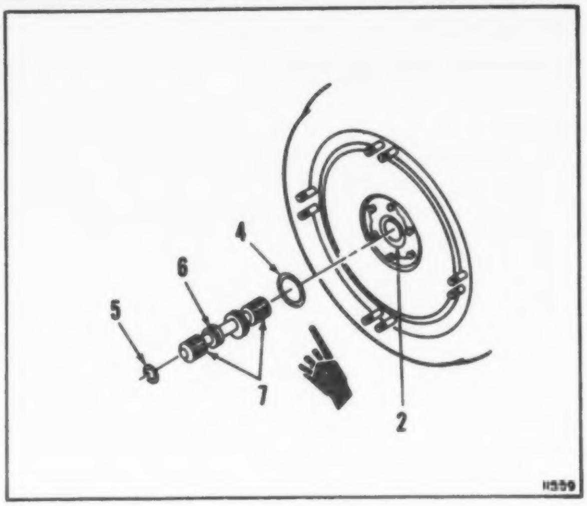
## 6-107 INSTALL ENGINE TRANSMISSION (Continued) 6-107

2. Install packing (4) on engine (2).
3. Install packing (5) on quill shaft (6).

**CAUTION**

**Do not use grease on quill shaft splines. Grease will contaminate transmission oil.**

4. Coat splines (7) on both ends of quill shaft (6) with oil (E254). **Install shaft** in engine (2).



5. **Connect sling (T34) (8)** to lifting lug (9). Connect work hoist hook (10) to sling (T34)

**WARNING**

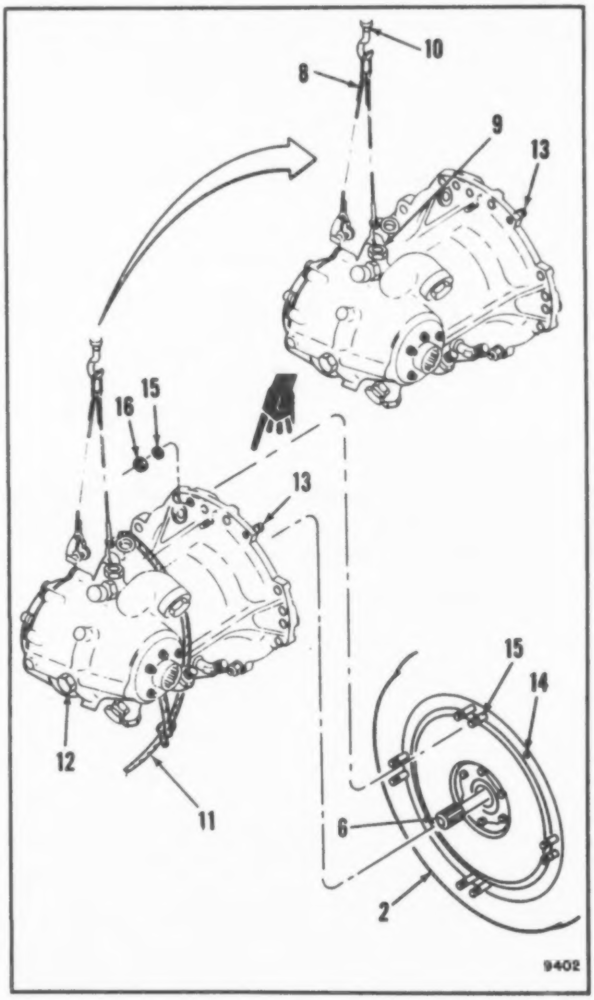
**Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.**

6. Attach guide line (11) to transmission (12).
7. Have helper raise hoist hook (10) to align transmission (12) with engine (2). Use guide line (11) to guide transmission. Align dowel pin (13) with hole (14) in engine.

**NOTE**

Dowel pin hole is at 1 o'clock position on engine.

8. **Install transmission (12)** on quill shaft (6) and 8 studs (15). Make sure dowel pin (13) aligns in engine hole (14).
9. **Install** eight washers (15) and **nuts (16). Torque nuts to 315 inch-pounds.**
10. Remove work hoist hook (10) from sling (T34) (8). Remove sling from lifting lug (9). Remove guide line (11).



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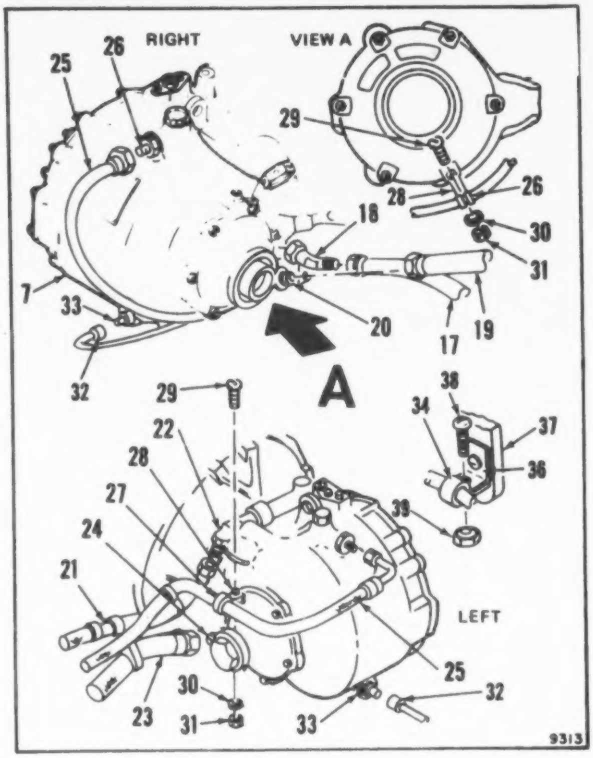
## 6-107 INSTALL ENGINE TRANSMISSION (Continued) 6-107

11. **On right installation, connect hose (17)** to elbow (18). **Connect hose (19)** to reducer (20).
12. **On left installation, connect hose (21)** to elbow (22). **Connect hose (23)** to reducer (24).
13. **Connect breather hose (25)** to reducer (26). Torque to 75 inch-pounds.
14. Install breather hose clamp (27) on clip (28) with screw (29), washer (30), and nut (31).
15. **Connect connector (32)** to temperature and chip detector (33).
16. Position clamp (34) with temperature and chip detector wiring (35) against clip (36) on lower lifting lug (37). Install screw (38) and nut (39).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***INSPECT***

FOLLOW-ON MAINTENANCE:

Install engine transmission adapter assembly and engine drive shaft (Task 6-32).

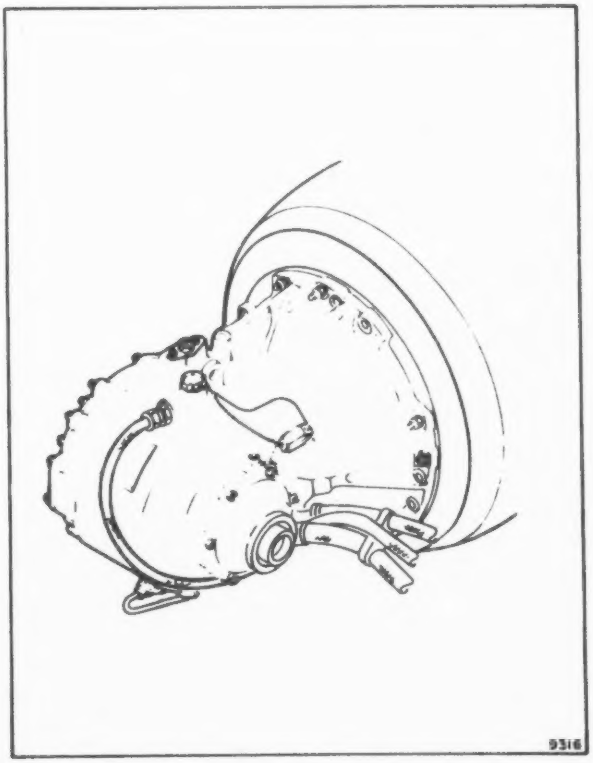
Close pylon hinged fairing (Task 2-2).

Install engine transmission fairing (Task 4-73).

Install engine air inlet screen (Task 4-76).

Service engine transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

# SECTION VIII
# OIL SYSTEMS

## 6-108 CONTAMINATION ANALYSIS OF FORWARD TRANSMISSION OIL 6-108

INITIL SETUP

***Applicable Configurations:***
All

***Tools:***
Magnet
Magnifying Glass, 12-Power

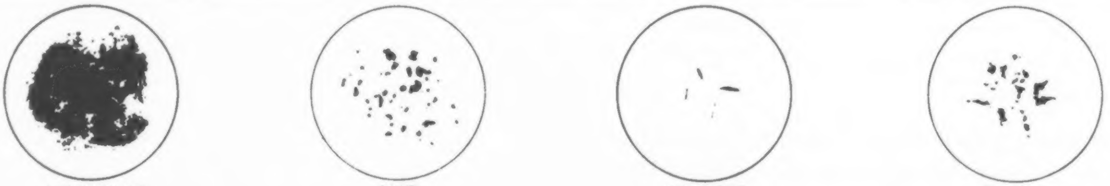
***Materials:***
None

***Personnel Required:***
67U30 Inspector

***Equipment Condition:***
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
   a. Separate steel particles. Use a magnet.
   b. Identify and separate remaining particles by visual inspection.
   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

| MATERIAL | DESCRIPTION | ACTION REQUIRED |
|---|---|---|
| Steel | Fine, hair-like fuzz particles | Normal wear. No action required |
| | Limited amount of splinters, flakes, or or granular particles | Possible failure. Perform serviceability check (Task 6-112) |
| | Thin flakes up to 1/16-inch in diameter and 1/4-inch long, maximum of 10 flakes | Perform serviceability check (Task 6-112) |
| | Massive amount of splinters, flakes, or granular particles | Failure. Replace transmission (Task 6-46 and 6-51) |
| Aluminum or magnesium | Granular particles | Perform serviceability check (Task 6-112) |
| Copper, bronze, or silver | Limited amount of granular particles | Possible indication of bearing cage wear. Perform serviceability check (Task 6-112) |
| | Massive amount of granular particles or chip particles | Failure. Replace transmission (Task 6-46 and 6-51) |
| Fiberglass | Granular or fibrous particles | Perform serviceability check (Task 6-112) |


GRANULAR PARTICLES CHIP PARTICLES SPLINTER PARTICLES FLAKE PARTICLES

FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-109 FORWARD TRANSMISSION OIL SYSTEM ALLOWABLE LEAKAGE 6-109

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Flashlight

***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter on Level Surface

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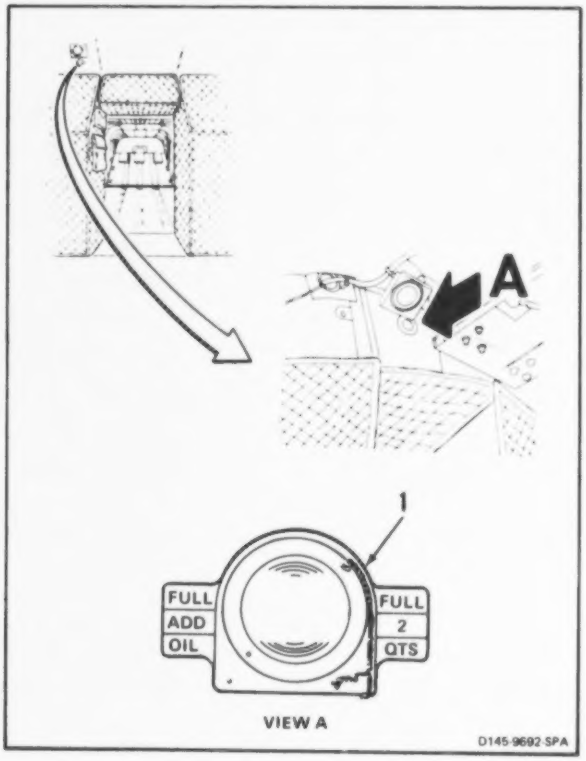


**WARNING**

**Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.**

**CAUTION**

**The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is 20 drops (one cubic centimeter) per hour. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.**

**NOTE**

If engines have not been operated within the past 30 minutes , perform a 5-minute ground run (TM 55-1520-240-10).

**Check sight gage (1)** from cockpit to determine oil level. **Oil level shall be between the FULL and ADD OIL lines after a 2 hour flight.**

FOLLOW-ON MAINTENANCE:

Service forward transmission, if needed (Task 1-54).

**END OF TASK**

## 6-110 DRAIN FORWARD TRANSMISSION OIL 6-110

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Container, 14-Quart (2)

Hose, 3/4-Inch ID, 36 Inches Long

***Materials:***

None

***Personnel Required:***

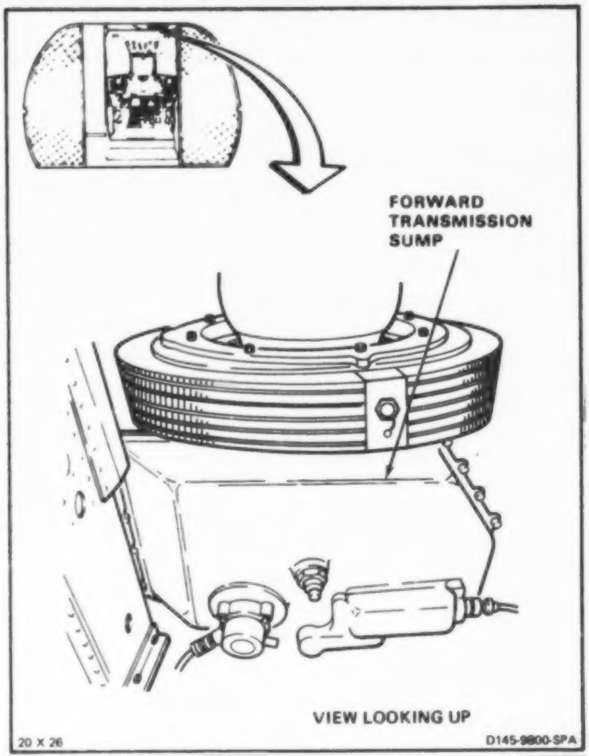
Medium Helicopter Repairer

***Equipment Condition:***

Battery Disconnected (Task 1-39)

Electrical Power Off

Forward Transmission Drip Pan Removed (Task 2-3)


FORWARD TRANSMISSION SUMP
VIEW LOOKING UP
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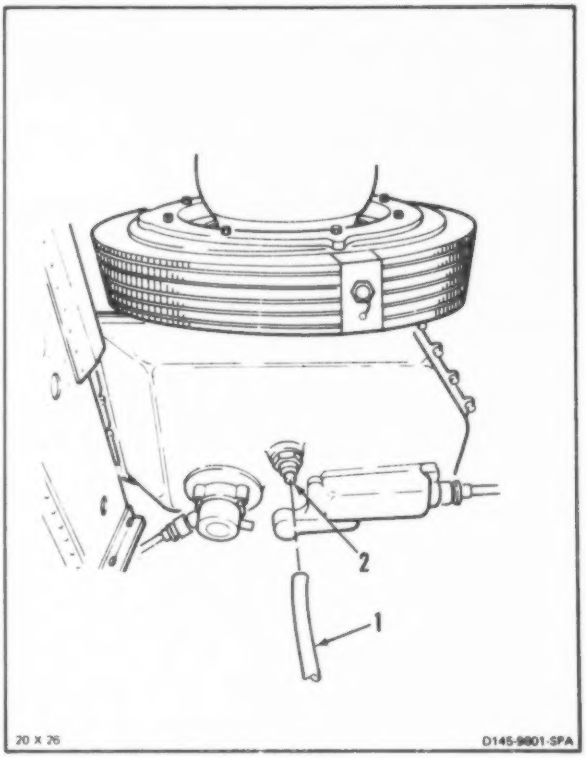
**NOTE**

Sump holds about 23 quarts of oil.

1. **Connect hose (1)** to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
3. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-2).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**END OF TASK**

## 6-111 FLUSH FORWARD TRANSMISSION OIL SYSTEM 6-111

INITIAL SETUP

***Applicable Configurations:***
All

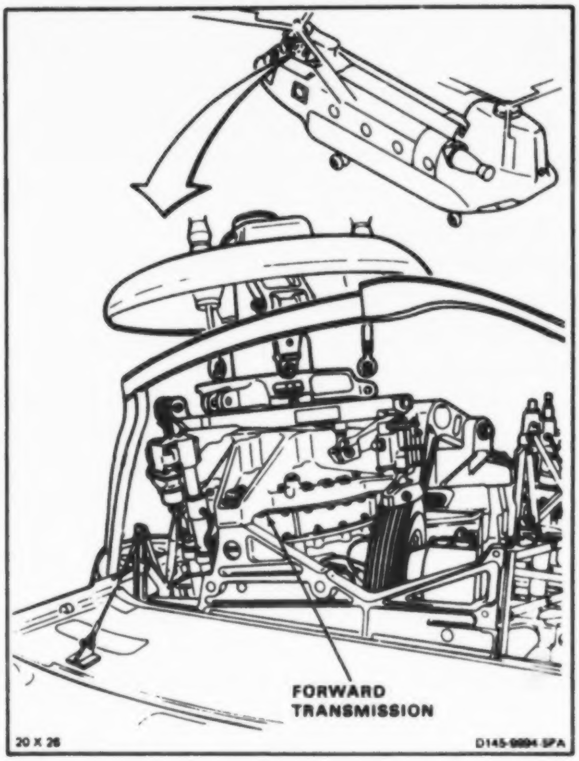
***Tools:***
Aircraft Mechanic'sTool Kit,
NSN 5180-00-323-4692

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

***References:***
Task 1-54
Task 6-110
Task 6-123
Task 6-129
Task 6-130
Task 6-132
Task 6-133
Task 6-134
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)



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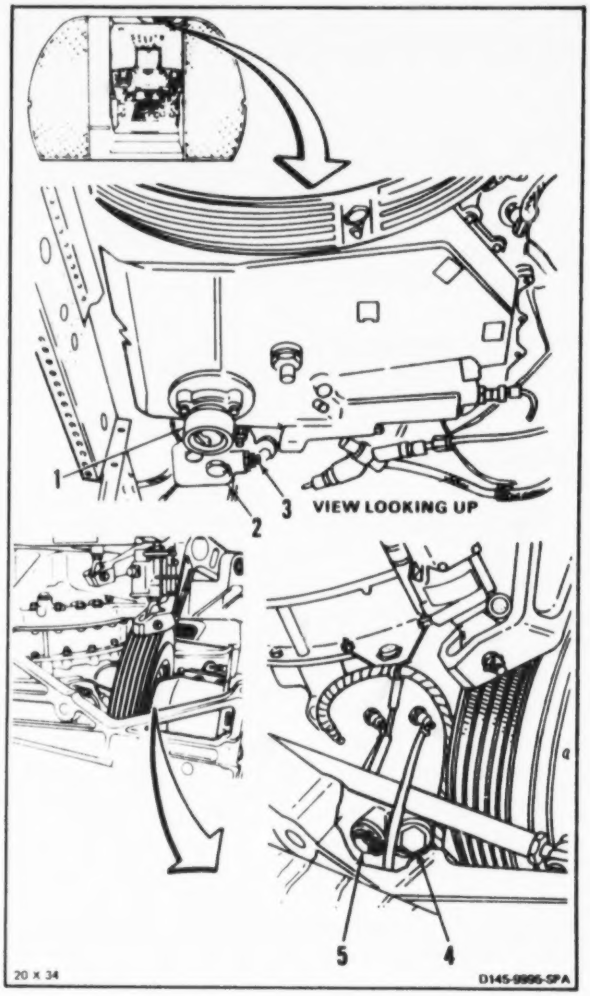
## 6-111 FLUSH FORWARD TRANSMISSION OIL SYSTEM (Continued) 6-111

1. **Drain oil** from forward transmission (Task 6-110).
2. Remove and **clean debris detection screen** cap (1) (Task 6-133). Install cap (Task 6-134).
3. **Replace main oil filter element (2).** Task 6-123). Note position of indicator button (3).
4. If indicator button (3) was extended, **replace inlet screen (4)** (Task 6-130 and 6-132).
5. **Replace auxiliary oil filter (5)** (Task 6-129).
6. **Service forward transmission** with oil (Task 1-54).
7. Have pilot **perform ground run** (TM 55-1520-240-10). When forward transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. **Repeat steps 1 through 6.**



FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-3).

END OF TASK

## 6-112 FORWARD TRANSMISSION SERVICEABILITY CHECK 6-112

INITIAL SETUP

***Applicable Configurations:***
All

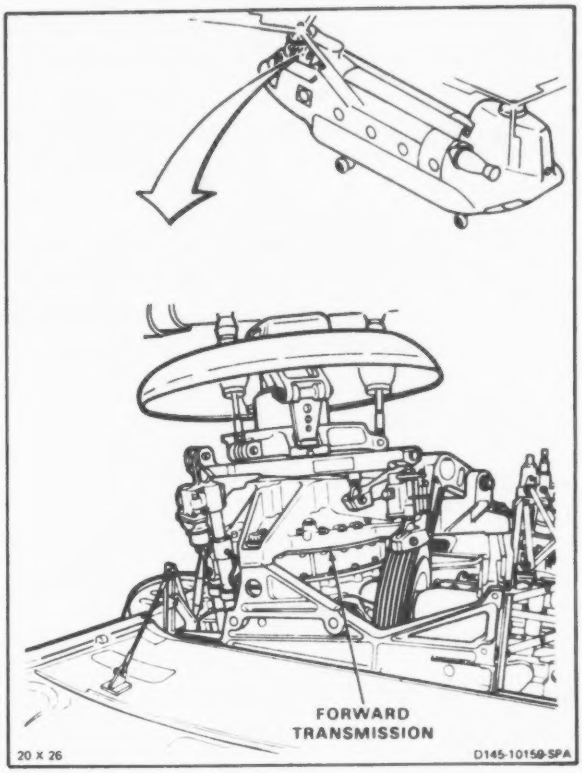
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Cheesecloth (E112)

***Personnel Required:***
67U20 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

***References:***
Task 1-5
Task 6-110
Task 6-111
Task 6-123
Task 6-129
Task 6-130
Task 6-131
Task 6-132
Task 6-133
Task 6-134
Task 6-46
Task 6-51
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Forward Transmission Fairing Left Work Platform Open (Task 2-2)



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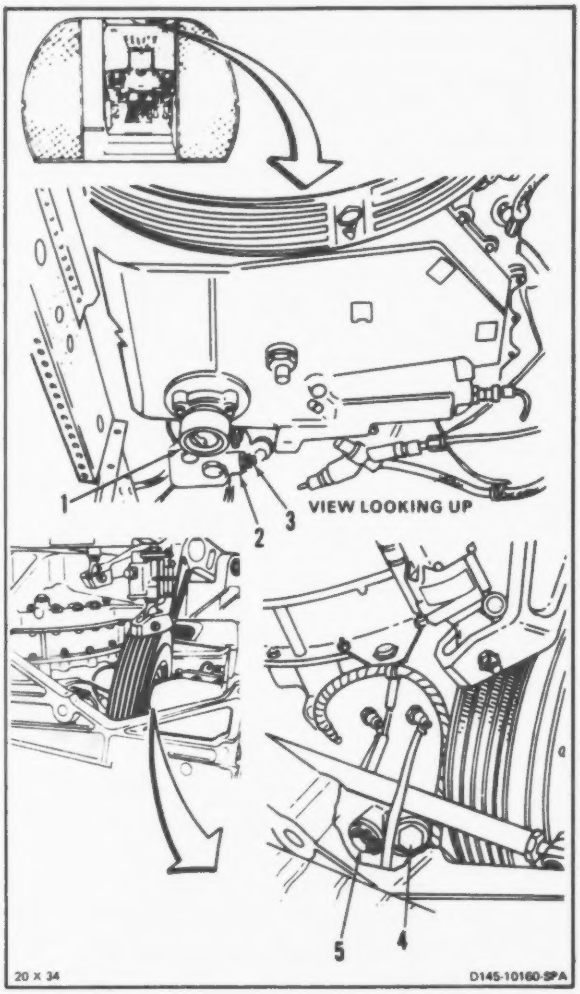
## 6-112 FORWARD TRANSMISSION SERVICEABILITY CHECK (Continued) 6-112

1. **Drain oil through cheesecloth (E112)** or similar filter material (Task 6-110). **Check for debris.**
2. Remove and **clean debris detection screen cap (1)** (Task 6-133). **Install cap** (Task 6-134).
3. **Replace element in main oil filter (2)** (Task 6-123). Note position of indicator button (3). **If button is extended, remove and inspect inlet screen (4)** (Task 6-130 and 6-131). Install screen (6-132).
4. **Replace auxiliary oil filter (5)** (Task 6-129).
5. **Service transmission** (Task 1-54).
6. Have pilot **perform ground run for 1 hour** at normal rotor rpm (TM 55-1520-240-10). If forward transmission oil pressure or temperature changes abnormally or if debris screen or chip detector light comes on, have pilot shut down helicopter. Check for cause.
7. **Drain oil** through cheesecloth (E112) or similar filter material (Task 6-110). **Check for debris.**
8. Remove, inspect, and **clean debris screen cap (1)** (Task 6-133). **Install cap** (Task 6-134).
9. **Remove element in main oil filter (2). If** element contains **debris or** filter **button (3)** was **extended, replace** with new **element** (Task 6-123).
10. **If** element in filter (2) contains **debris and** filter **button (3)** was also **extended,** remove, **inspect,** and install **inlet screen (4)** (Task 6-130, 6-131, and 6-132).
11. **Replace auxiliary oil filter (5)** (Task 6-129).
12. **If** quantity and size of **particles** obtained from oil filters (2 and 4) and cap (1) **have not decreased by at least 30 percent** from original amount, **replace forward transmission** (Task 6-46 and 6-51).



13. **If** quantity and size of **particles** obtained from oil filters (2 and 4) and cap (1) **have decreased by 30 percent or more, repeat steps 1 thru 11.** If any debris is obtained, replace forward transmission (Task 6-46 and 6-51).

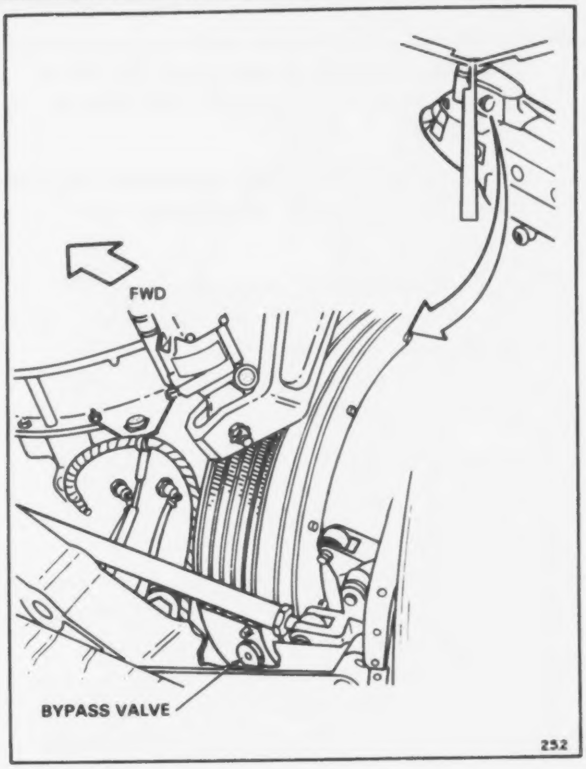
FOLLOW-ON MAINTENANCE:

Close forward transmission fairing left work platform (Task 2-2).

Install forward transmission drip pan (Task 2-3).

**END OF TASK**

## 6-112.1 REPLACE FORWARD TRANSMISSION OIL COOLER BYPASS VALVE 6-112.1



INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 2-Quart
Socket, 1 1/2-Inch

***Materials:***
Lockwire (E231)
Oil (E254)
Cloths (E120)

***Parts:***
Packings (2)

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Forward Transmission Fairing Open (Task 2-2)
Forward Transmission Drip Pan Removed (Task 2-3)

***General Safety Instructions:***

**WARNING**

- **Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**
- **Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**

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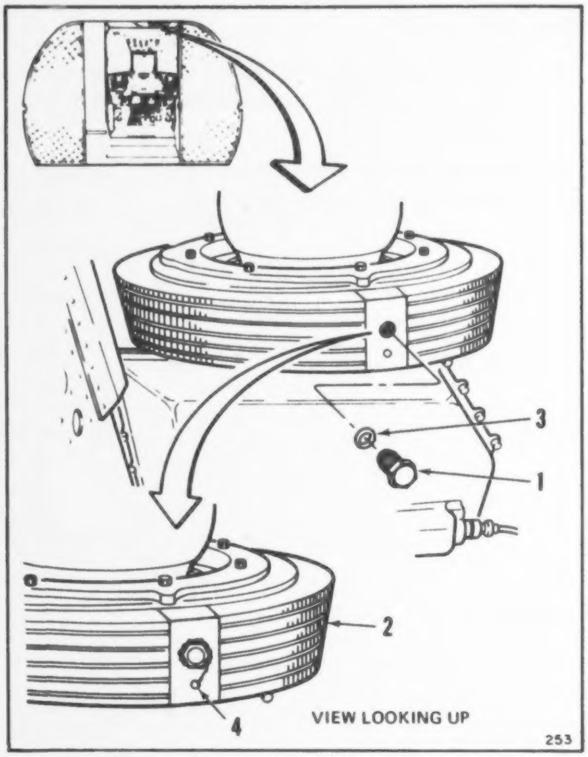
## 6-112.1 REPLACE FORWARD TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-112.1

### *DRAIN OIL COOLER*

1. Remove lockwire from drain plug (1). Remove plug from oil cooler (2). Drain oil into container.
2. Remove packing (3) from plug (1).
3. Install packing (3) on drain plug (1). **Install drain plug.** Lockwire plug to nipple (4). Use lockwire (E231).

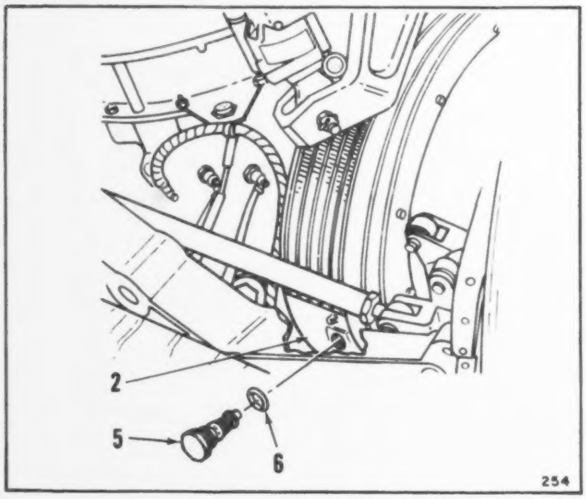


### *REMOVE VALVE*

**NOTE**

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). **Remove valve** from oil cooler (2). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).



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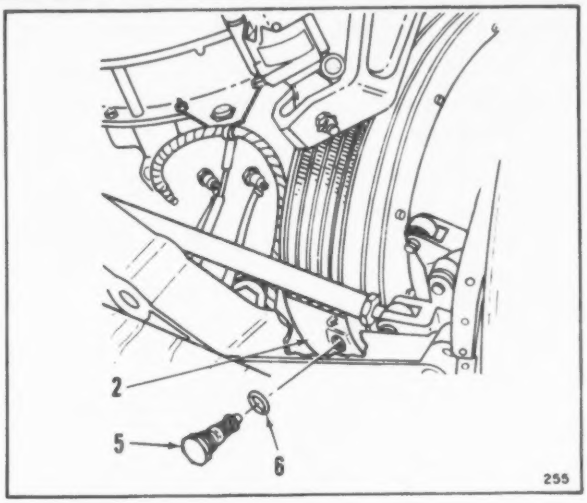
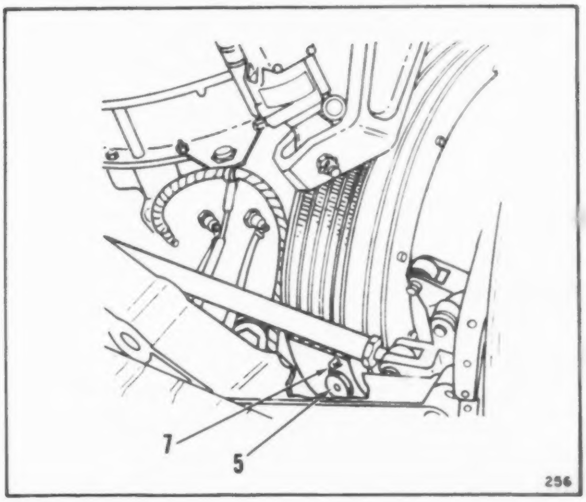
## 6-112.1 REPLACE FORWARD TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-112.1

***INSTALL VALVE***

6. Coat packing (6) and thread of bypass valve (5) with oil (E254). **Install packing** on valve.
7. **Install valve (5)** in oil cooler (2). **Torque valve to 80 inch-pounds.**



8. Lockwire valve (5) to nipple (7). Use lockwire (E231).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-3).

Close left forward transmission fairing (Task 2-2).

Service forward transmission (Task 1-54).

**END OF TASK**

## 6-113 REMOVE FORWARD TRANSMISSION OIL COOLER 6-113

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323

Container, Two Quart

Wrench, 1 Inch

Rawhide Mallet

***Materials:***

None

***Parts:***

Packing

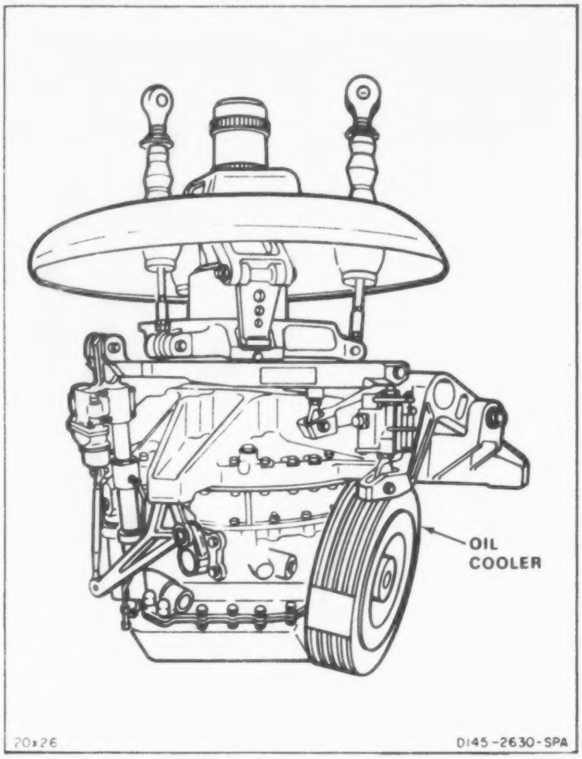
***Personnel Required:***

Medium Helicopter Repairer (2)

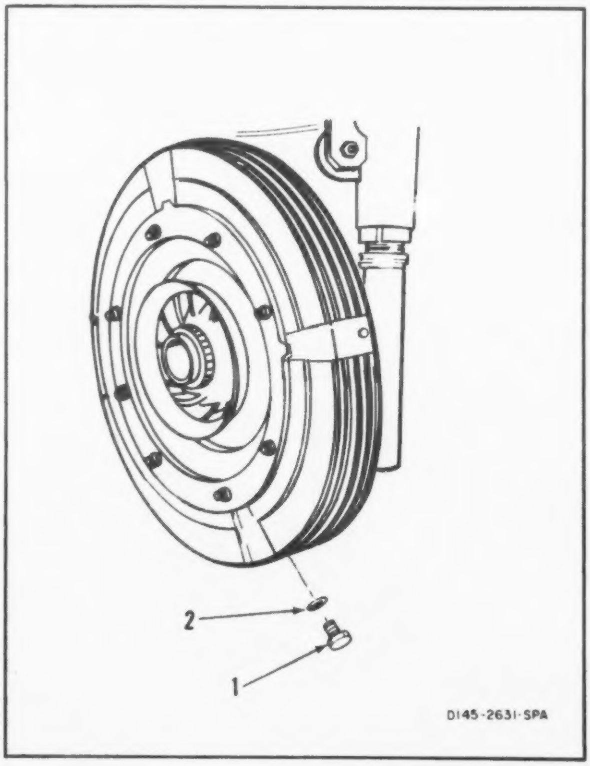
***Equipment Condition:***

Off Helicopter Task

Forward Transmission Removed (Task 6-46)



1. Remove lockwire from drain plug (1). Remove plug and packing (2). **Drain oil** into container.
2. Install plug (1) and packing (2). **Torque plug to 80 inch-pounds.**



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## 6-113 REMOVE FORWARD TRANSMISSION OIL COOLER (Continued) 6-113

3. **Remove eight nuts (3)** and washers (4) from studs (5).

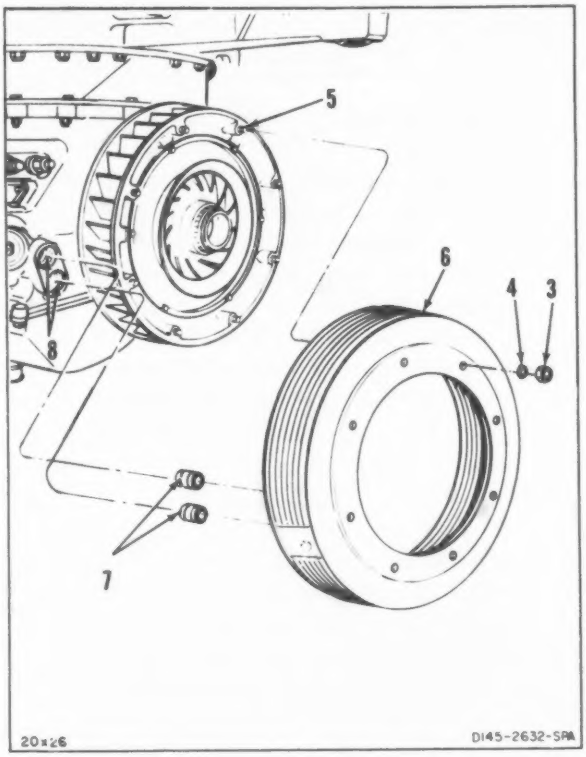
**CAUTION**

**Do not damage oil transfer tubes when removing cooler.**

**NOTE**

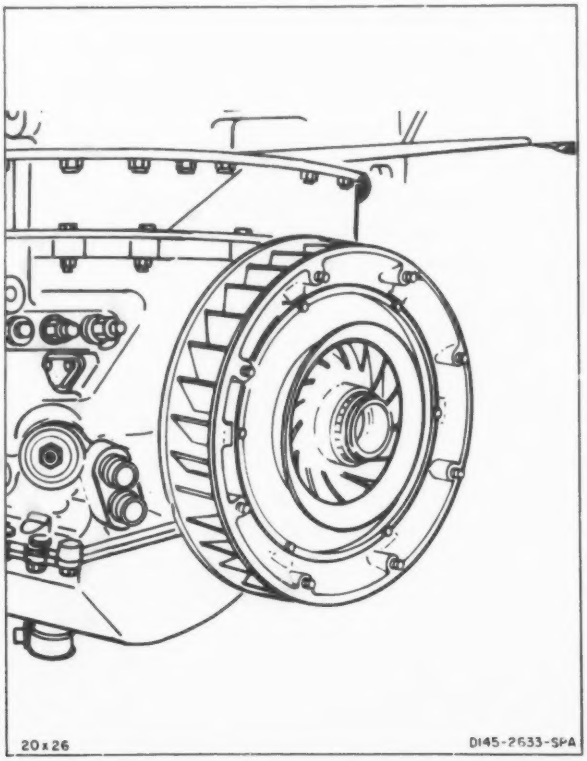
Transfer tubes may come off with cooler or stay in transmission.

4. Loosen cooler (6) with rawhide mallet. With aid of helper, **pull cooler straight back** from studs (5). Drain oil into container.
5. If tubes (7) come out with cooler (6), remove tubes from cooler. **Install tubes in transmission ports (8).**



FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-113.1 REPAIR FORWARD TRANSMISSION OIL COOLER OUTSIDE SURFACE 6-113.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Dial Indicating Depth Gage 643J

Goggles

***Materials:***

Naphtha (E245)

Emery Cloth (E123) or

Abrasive Paper (E13)

Crocus Cloth (E122)

Cloths (E120)

Gauze Sponges (E184)

Gloves (E186)

Acetic Acid (E21)

Alodine Powder (E65)

Epoxy Primer (E293)

Epoxy Topcoat (E166)

***Personnel Required:***

68D20 Aircraft Powertrain Repairer

68D30 Inspector

***References:***

TM 43-0103

MIL-C-5541

MIL-C-22751

***Equipment Condition:***

Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, mek, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

## 6-113.1 REPAIR FORWARD TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued) 6-113.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cooler (1).

**NOTE**

Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**

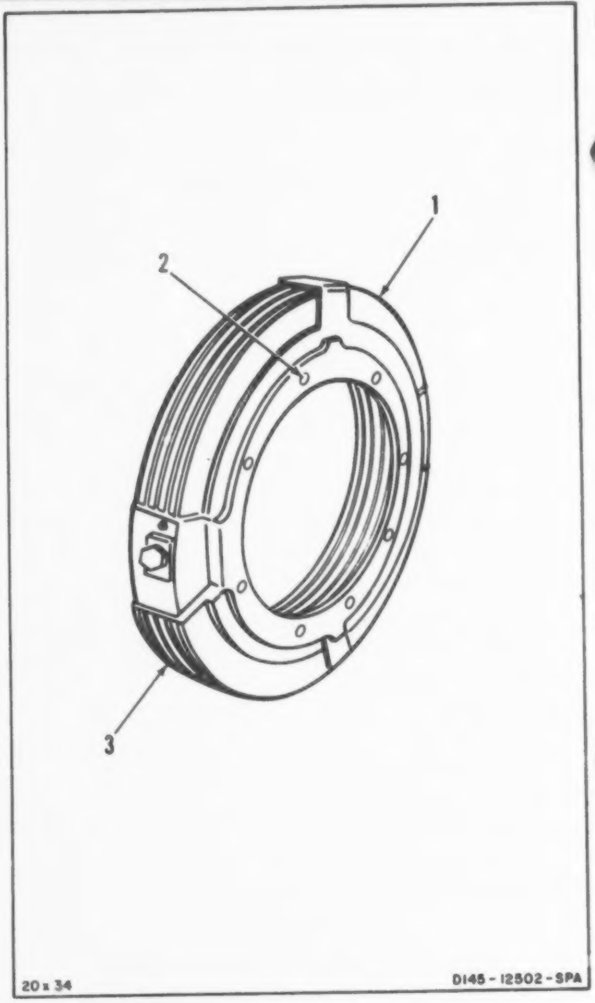
   b. **Damage shall not extend over more than one surface or enter any radius.**

   c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**

   d. **More than 3 inches of fins (3) shall not be crushed beyond straightening.**

   e. **If any fin (3) is bent more than 30 degrees, straighten it.**

3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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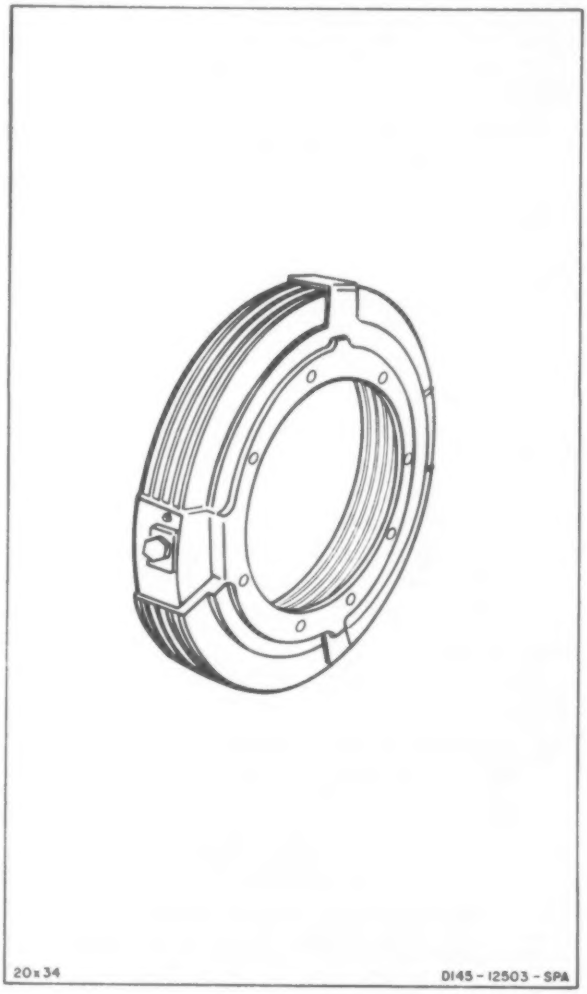
## 6-113.1 REPAIR FORWARD TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued) 6-113.1

6. Acid-etch reworked area as follows:
   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**
   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**
   c. **Rinse area with cold water.**
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean reworked area with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. **Swab on solution of alodine powder (E65) and water (MIL-C-5541). Use gauze sponges (E184). Swab for 2 to 5 minutes. Rinse area** with cold water and let air dry.
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.
11. **Apply epoxy topcoat (E166)** (MIL-C-22751).

***INSPECT***

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-114 INSTALL FORWARD TRANSMISSION OIL COOLER 6-114

INITIAL SETUP

***Applicable Configurations:***
All

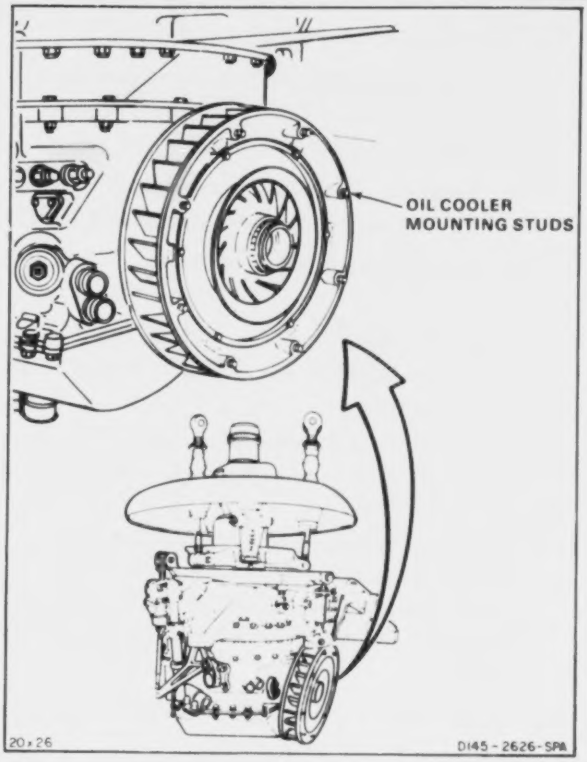
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Rawhide Mallet

***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)
Lockwire (E230)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P



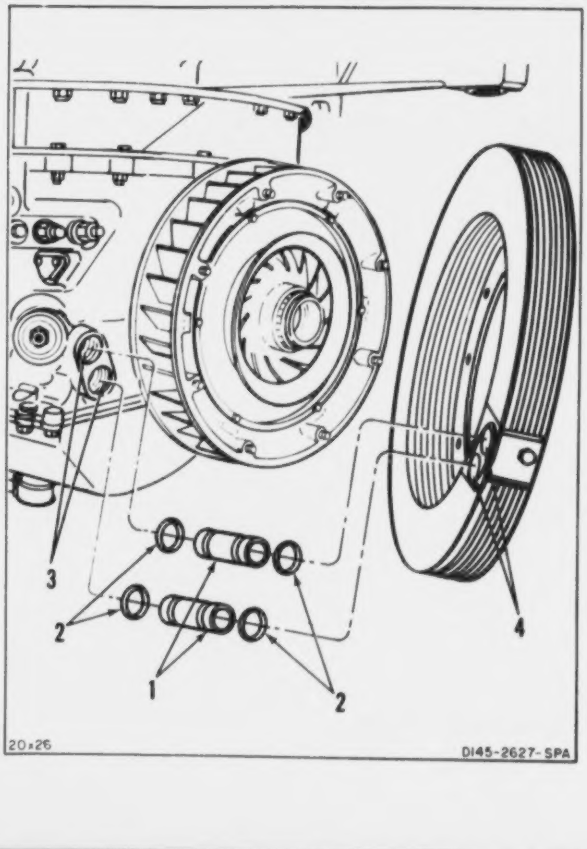
1. **Remove two oil transfer tubes (1) and four packings (2)** from transmission ports (3).

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

2. Clean transmission ports (3) and cooler ports (4). Use solvent (E162) and cloths (E120). Wear gloves (E186).

3. **Install transfer tubes (1)** and packings (2) in transmission ports (3).



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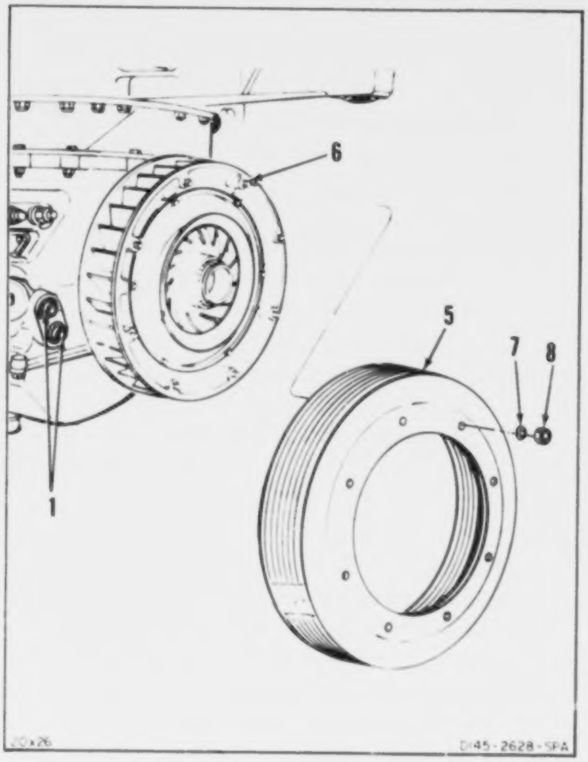
## 6-114 INSTALL FORWARD TRANSMISSION OIL COOLER (Continued) 6-114

**CAUTION**

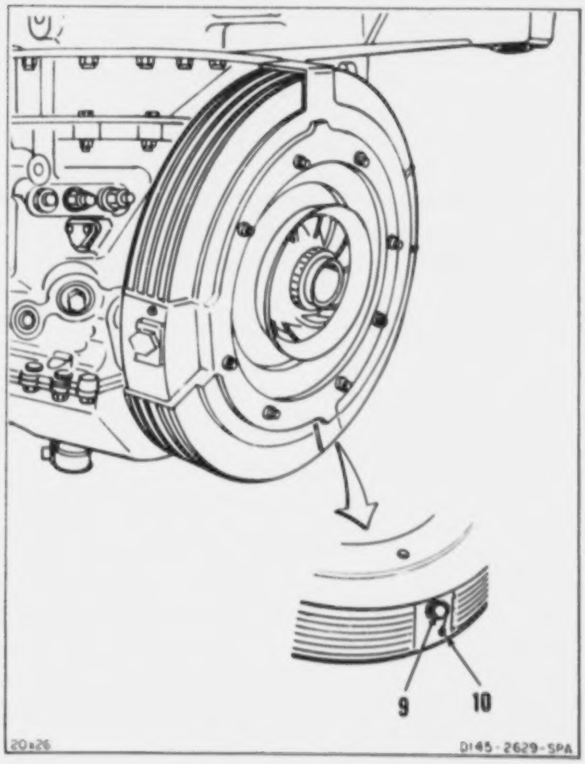
**Transfer tubes can be damaged if cooler is not aligned.**

4. Align cooler (5) with eight studs (6) and two transfer tubes (1). **Install cooler** on studs and tubes. Use rawhide mallet.
5. **Install eight** washers (7) and nuts (8) on studs (6). **Torque nuts to 60 inch-pounds.**



6. Lockwire drain plug (9) to nipple (10), if required. Use lockwire (E230).

***INSPECT***



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

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## 6-114.1 REPAIR FORWARD TRANSMISSION OIL COOLER FAN ASSEMBLY 6-114.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Depth Gage 643J
Goggles

***Materials:***
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer
68D30 Inspector

***References:***
TM 43-0103
MIL-M-3171, Type VI
MIL-C-22751

***Equipment Condition:***
Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cuase burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

*GO TO NEXT PAGE*

## 6-114.1 REPAIR FORWARD TRANSMISSION OIL COOLER FAN ASSEMBLY (Continued) 6-114.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** location and extent of **damage** on fan parts.

   **NOTE**

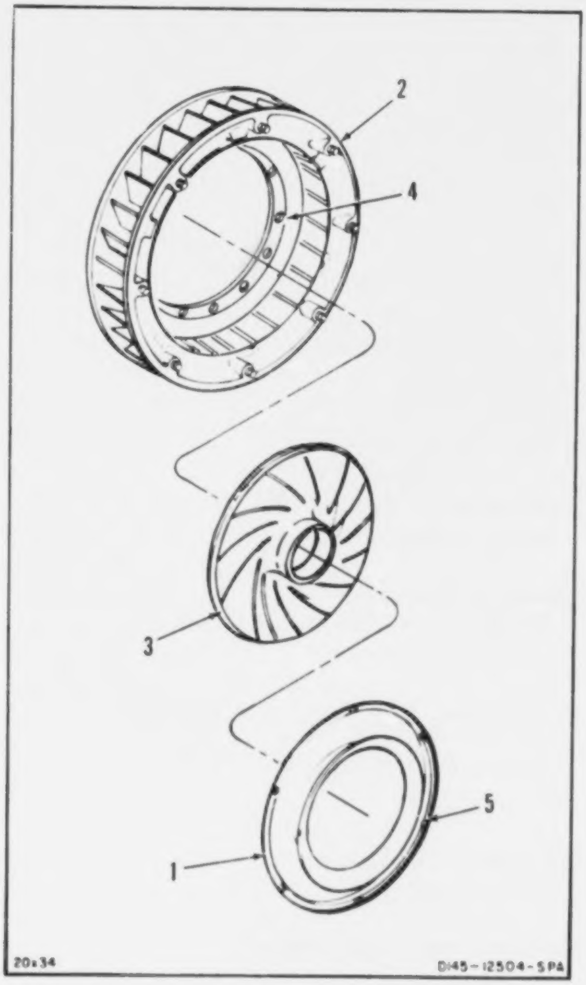
   Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage on shroud (1) and diffuser (2) shall not be more than 0.025 inch.**

   b. **Depth of damage on impeller (3) shall not be more than 0.015 inch. There shall be no more than four damaged areas on one impeller blade.**

   c. **Damage shall not extend over more than one surface or enter any radius.**

   d. **Damage shall not be closer than 1.00 inch to any mounting hole (4).**
3. **Fluorescent inspect damaged area** to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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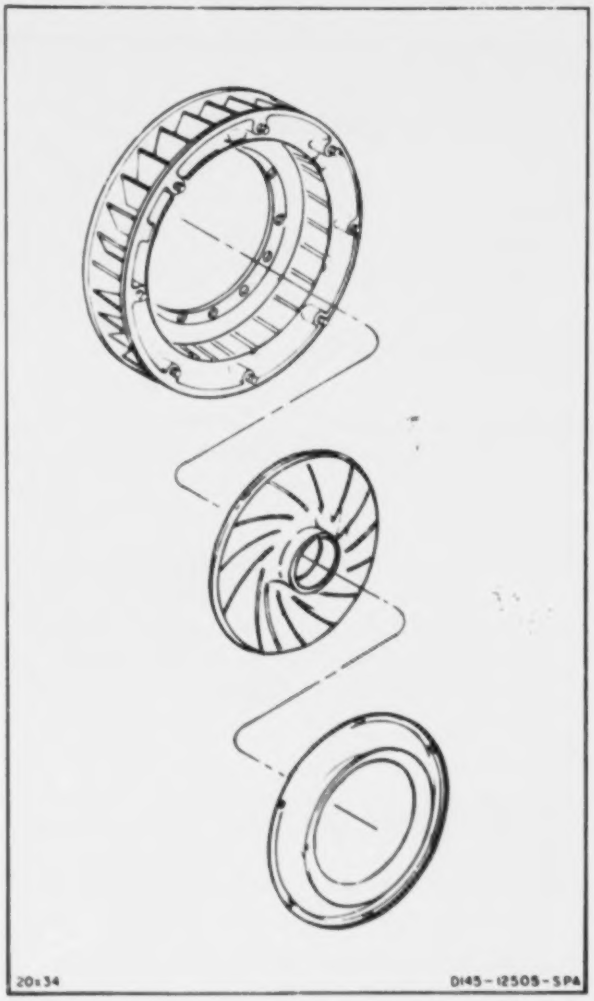
## 6-114.1 REPAIR FORWARD TRANSMISSION OIL COOLER FAN ASSEMBLY (Continued) 6-114.1



6. Acid-etch reworked area as follows.
   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**
   b. **Swab area with solution for 3 minutes. Use gauze sponges (E184).**
   c. **Rinse area with cold water.**
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean** reworked area **with naphtha (E246)** and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. **Swab on solution of chromic acid (E114) and calcium sulphate (E191) (MIL-L-3171, Type VI). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse area with cold water and let air dry.**
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 12 hours.
11. **Apply epoxy topcoat (E166)** (MIL-C-22751).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-115 REMOVE FORWARD TRANSMISSION OIL COOLER SHROUD 6-115

INITIAL SETUP

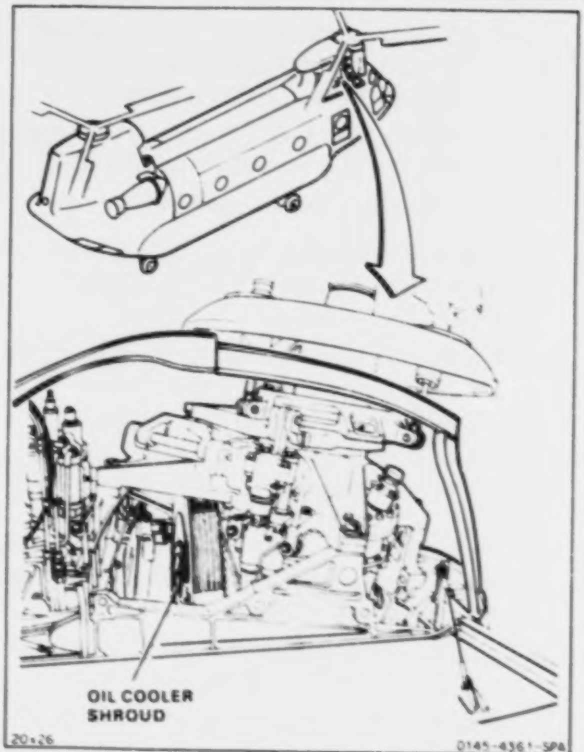
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

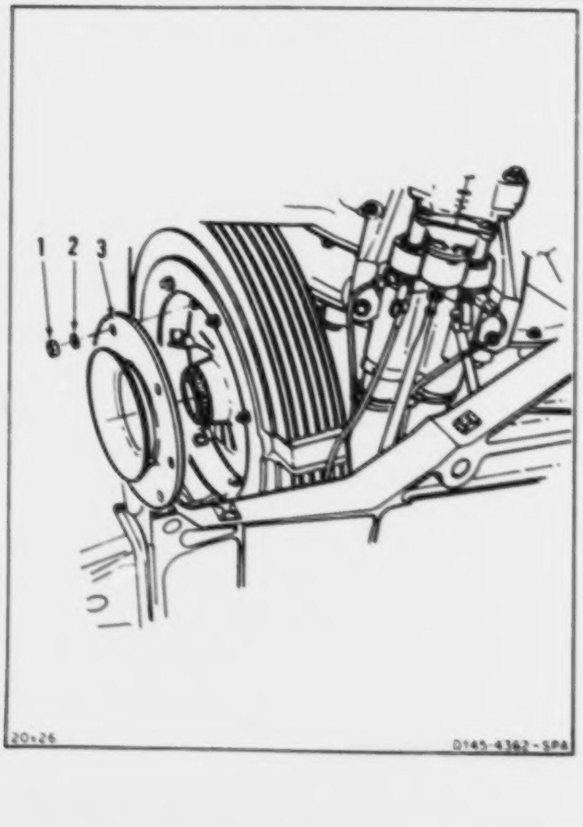
***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Fairing Open (Task 2-2)
Oil Cooler Air Inlet Duct Removed (Task 6-121)
No. 1 and No. 2 Drive Shafts Removed (Task 6-2 and 6-3)



1. Remove six nuts (1) and washers (2) from around shroud (3).
2. **Remove shroud (3).**



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-116 INSTALL FORWARD TRANSMISSION OIL COOLER SHROUD 6-116

INITIAL SETUP

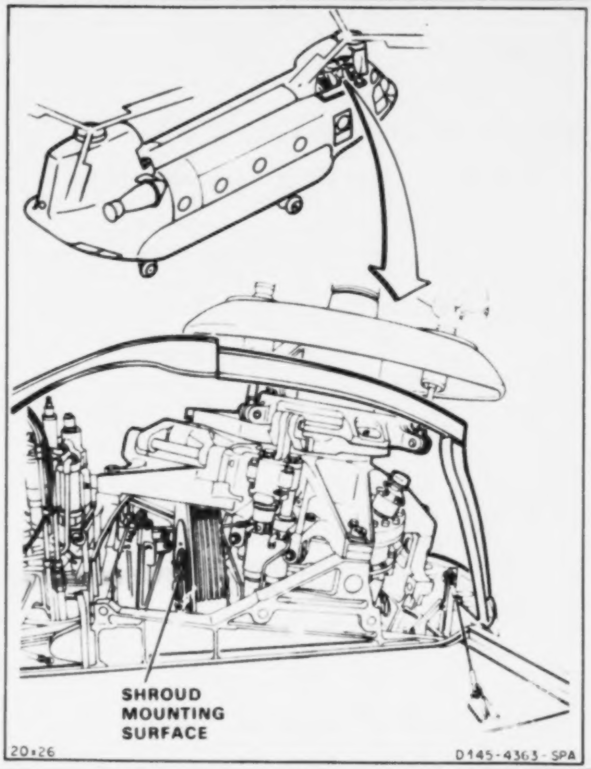
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P


SHROUD
MOUNTING
SURFACE
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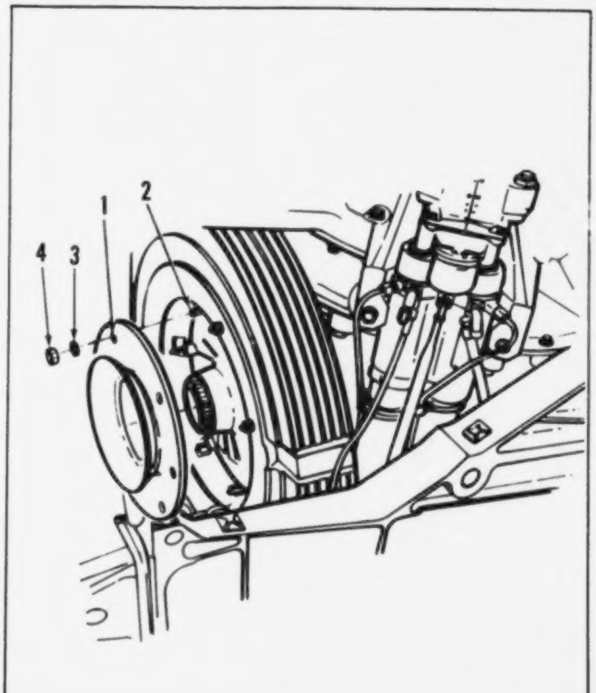
1. **Install shroud (1)** on six studs (2).
2. **Install six** washers (3) and **nuts (4). Torque nuts to 60 inch-pounds.**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***INSPECT***

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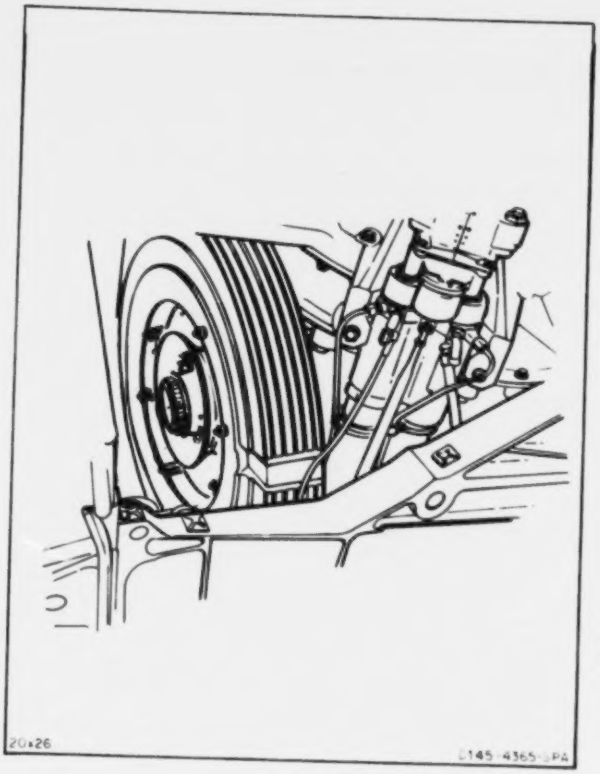
## 6-116 INSTALL FORWARD TRANSMISSION OIL COOLER SHROUD (Continued) 6-116

FOLLOW-ON MAINTENANCE:

Install No. 1 and No. 2 drive shafts (Task 6-17 and 6-18).

Install oil cooler air inlet duct (Task 6-122).

Close forward transmission fairing (Task 2-2).



**END OF TASK**

## 6-117 REMOVE FORWARD TRANSMISSION OIL COOLER IMPELLER 6-117

INITIAL SETUP

***Applicable Configurations:***

All.

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Spanner Wrench

Wood Plank, 2 Inches x 4 Inches x 36 Inches

Forward Transmission Input Shaft Adapter Assembly

***Materials:***

None

***Personnel Required:***

Medium Helicopter Repairer (2)

***Equipment Condition:***

Battery Disconnected (Task 1-39)

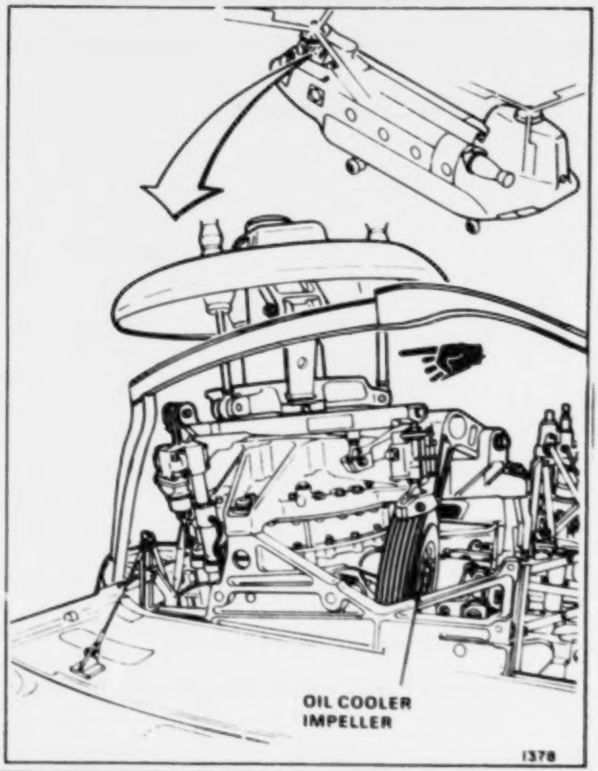
Electrical Power Off

Forward Transmission Fairings Open (Task 2-2)

Oil Cooler Air Inlet Duct Removed (Task 6-121)

Oil Cooler Fan Shroud Removed (Task 6-115)

Forward Transmission Adapter Assembly Removed (Task 6-5)



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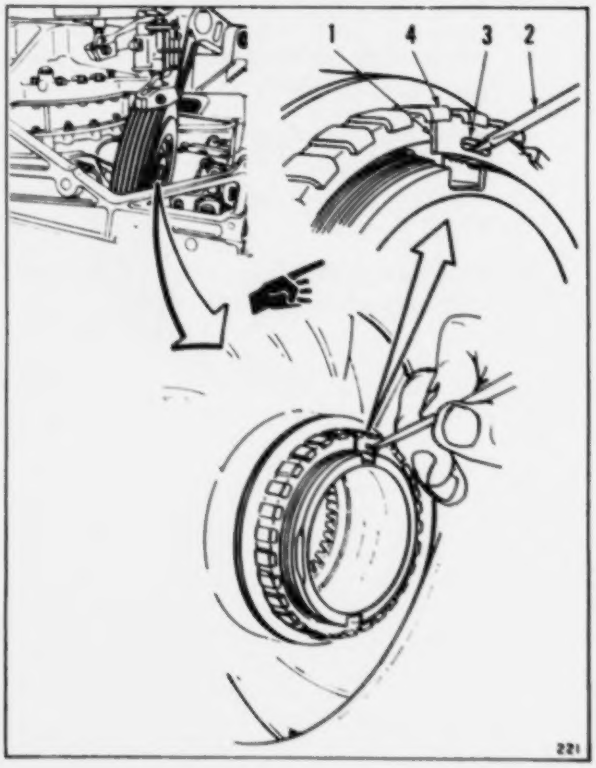
1. **Remove retaining ring (1)** as follows:
   a. Insert screwdriver (2) in slot (3).
   b. Pull down on ring (1) to free it from teeth of locknut (4).
   c. Peel entire length of ring (1) from under locknut (4).



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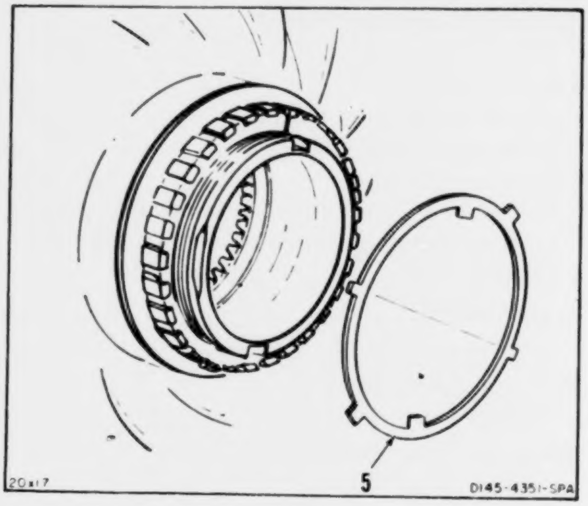
## 6-117 REMOVE FORWARD TRANSMISSION OIL COOLER IMPELLER (Continued) 6-117

2. **Remove tangwasher (5).**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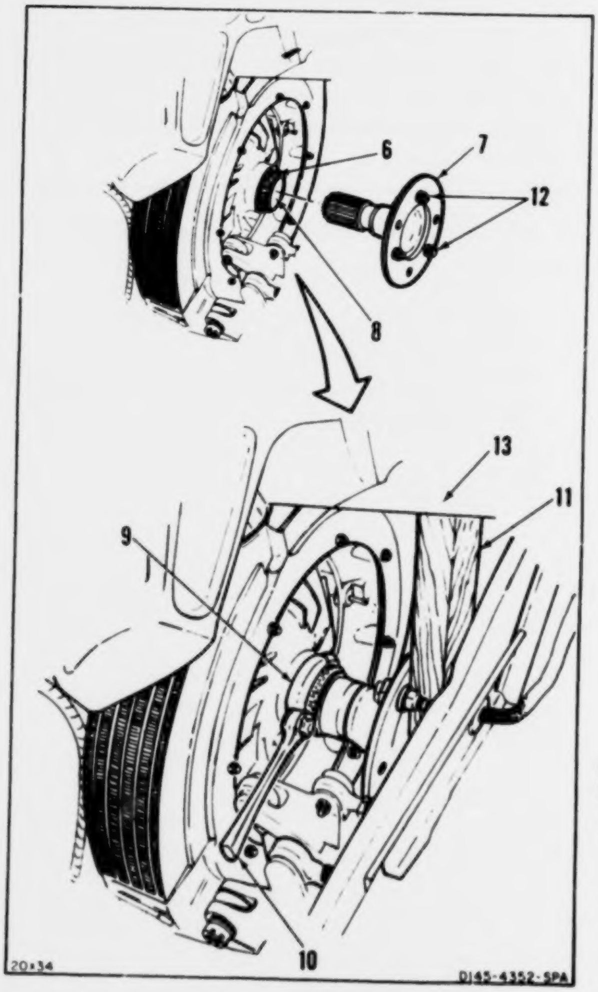
D145-4351-SPA

3. **Loosen locknut (6)** as follows:
   a. Install adapter assembly (7) in input shaft (8).
   b. Install spanner wrench (9) and socket drive (10) on locknut (6).
   c. Have helper place wood plank (11) across nuts (12) as shown.
   d. Have helper brace plank (11) against transmission lug (13) to keep adapter assembly (7) from turning. Loosen locknut (6).
   e. Remove spanner wrench (9), socket drive (10), and wood plank (11).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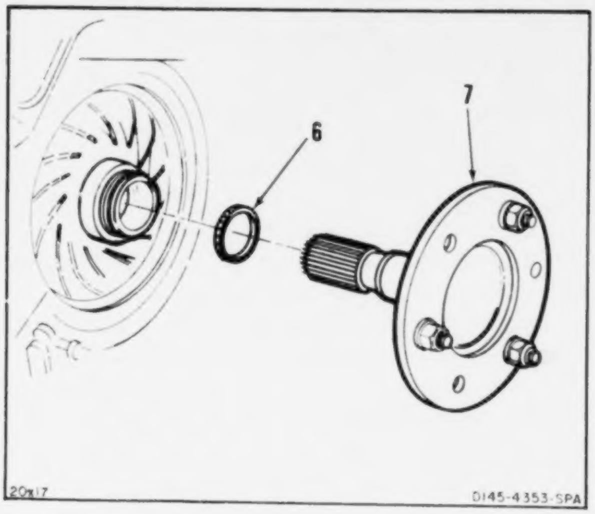
## 6-117 REMOVE FORWARD TRANSMISSION OIL COOLER IMPELLER (Continued) 6-117

4. Remove adapter assembly (7). **Remove locknut (6).**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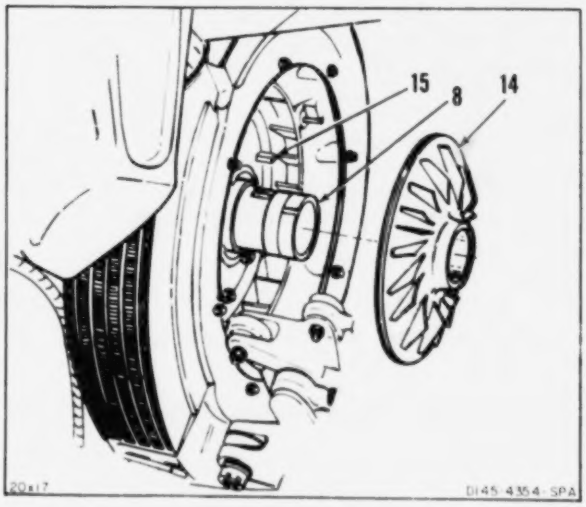
5. **Pull and remove impeller (14)** from shaft (8). Remove key (15) from shaft.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14
20x17
D145-4354-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-118 INSTALL FORWARD TRANSMISSION OIL COOLER IMPELLER 6-118

INITIAL SETUP

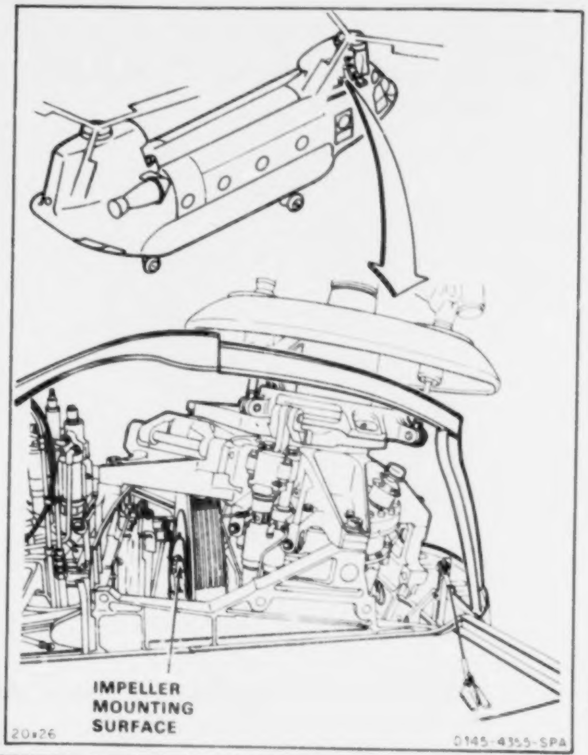
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Spanner Wrench
Torque Wrench, 0 to 600 Foot-Pounds
Socket Wrench Adapter, 1/2-Inch Sq Male End, 3/4-Inch Sq Female End
Wood Plank, 2 Inches x 4 Inches x 36 Inches
Forward Transmission Input Shaft Adapter Assembly
Rawhide Mallet

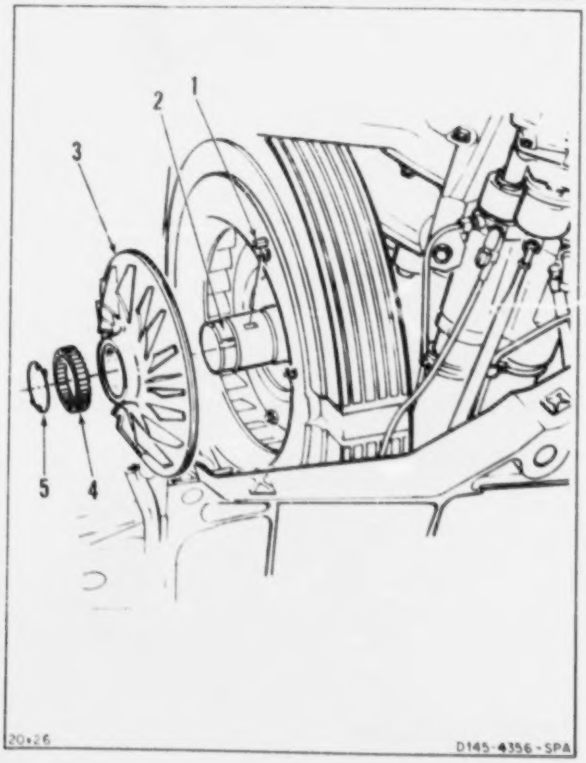
***Materials:***
Grease (E190)

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***References:***
TM 55-1520-240-23P



1. Install key (1) in shaft (2). Align impeller (3) with key. **Install impeller** on shaft. Use mallet.
2. Apply light coat of grease (E190) to thread of locknut (4). **Install locknut loosely** on shaft (2).
3. **Position tangwasher (5) over shaft (2).**



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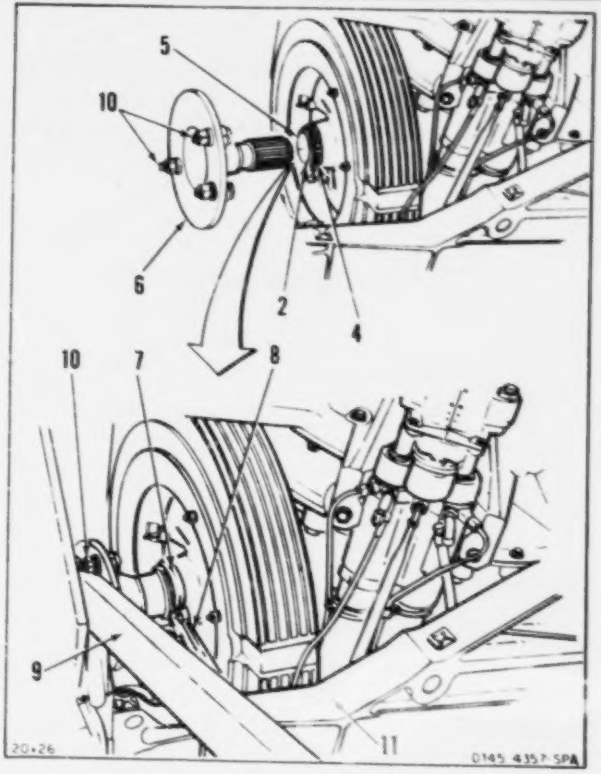
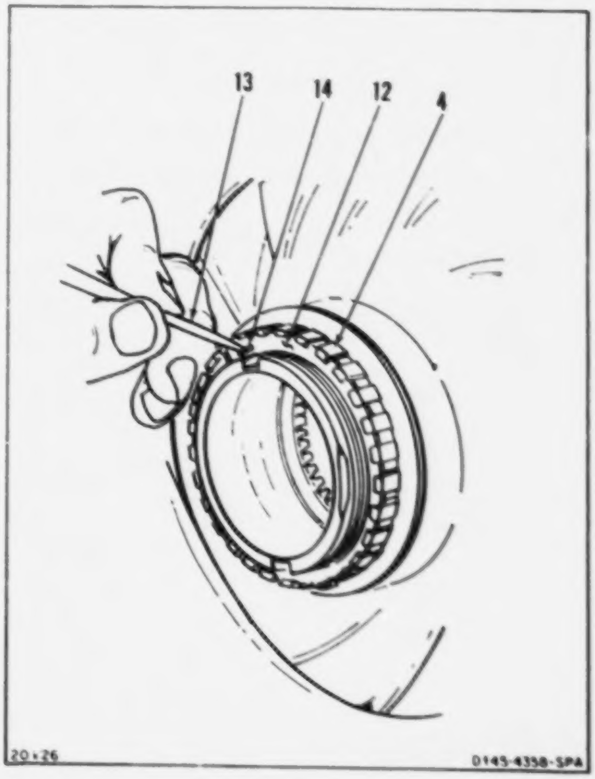
## 6-118 INSTALL FORWARD TRANSMISSION OIL COOLER IMPELLER (Continued) 6-118

4. **Torque locknut (4) and install tangwasher (5)** as follows:
   - a. Install adapter assembly (6) in input shaft (2).
   - b. Install spanner wrench (7) and torque wrench (8) on locknut (4).
   - c. Have helper place wood plank (9) across nuts (10) as shown.
   - d. Have helper brace plank (9) against structure (11) to keep adapter assembly (6) from turning. **Torque locknut (4) to 145 foot-pounds.**
   - e. Install tangwasher (5) on locknut (4). If tangs do not align with slots in nut, rotate tangwasher 180 degrees and install.
   - f. If tangs do not align, increase torque on locknut (4) in small steps until tangs align. **Do not torque over 155 foot-pounds.**
   - g. Remove adapter assembly(6), spanner wrench (7), torque wrench (8) and wood plank (9).



5. **Install retaining ring (12)** as follows:
   - a. Install end of retaining ring (12) under teeth of locknut (4).
   - b. Install entire length of retaining ring (12) under teeth of locknut (4). Compress end of ring as needed to install under locknut. Use thin screwdriver (13) inserted in slot (14).



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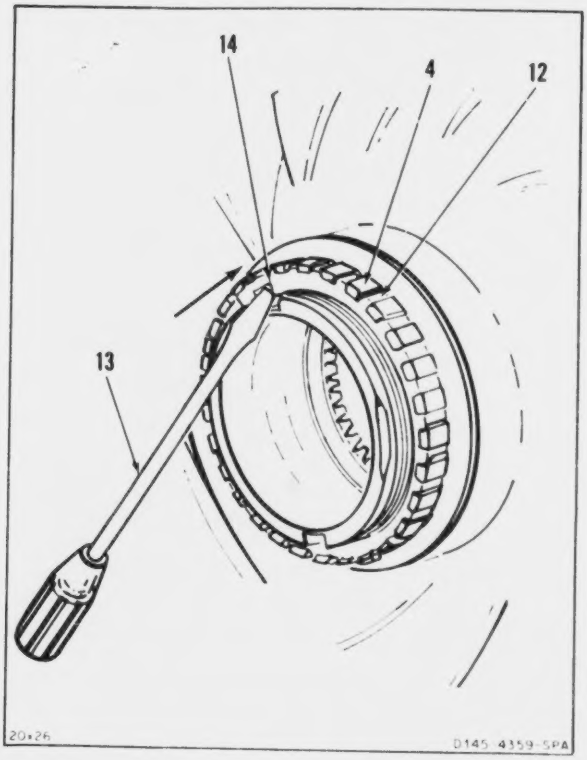
## 6-118 INSTALL FORWARD TRANSMISSION OIL COOLER IMPELLER (Continued)

c. Insert edge of screwdriver (13) in slot (14) and push retaining ring (12) clockwise. Ring shall expand under teeth of locknut (4) to lock.



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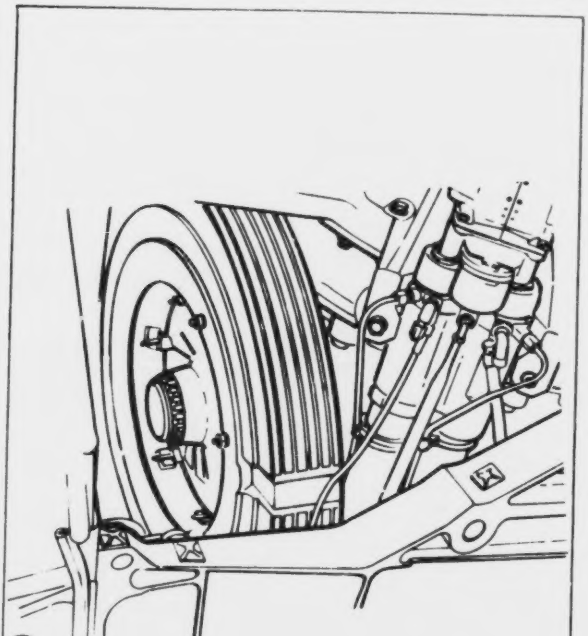


FOLLOW-ON MAINTENANCE:

Install oil cooler fan shroud (Task 6-116).

Install No. 1 and No. 2 drive shaft (Task 6-17 and 6-18).

Install oil cooler air inlet duct (Task 6-122).

Close forward transmission fairings (Task 2-2).

**END OF TASK**

## 6-119 REMOVE FORWARD TRANSMISSION DIFFUSER 6-119

INITIAL SETUP

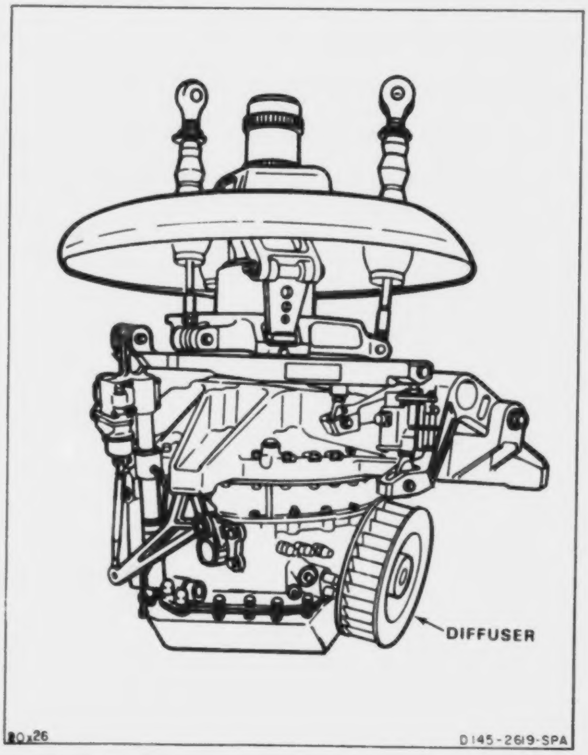
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Spanner Wrench
Wood Plank, 2 Inches x 4 Inches x 36 Inches
Forward Transmission Input Shaft Adapter Assembly

***Materials:***
None

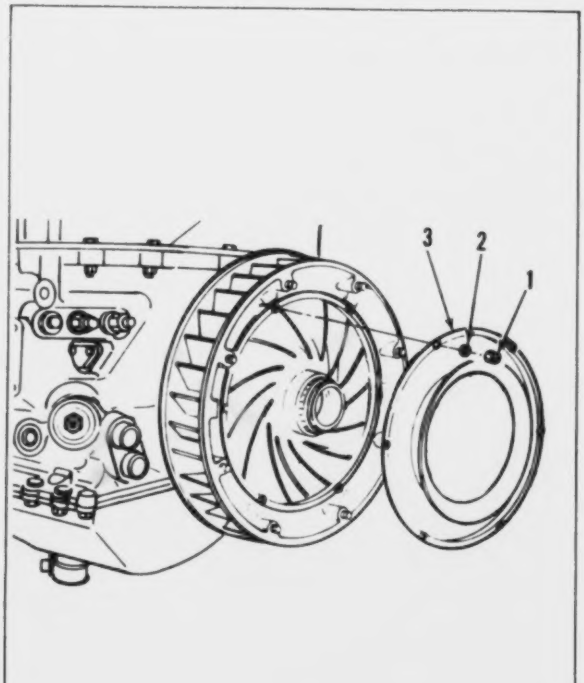
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer

***Equipment Condition:***
Off Helicopter Task
Oil Cooler Removed (Task 6-113)



### *REMOVE SHROUD*

1. Remove six nuts (1) and washers (2) from around shroud (3). **Remove shroud.**



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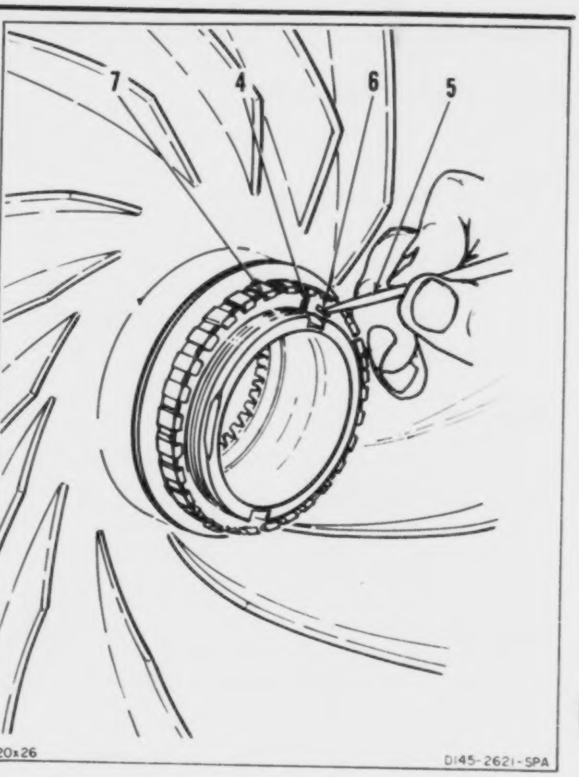
## 6-119 REMOVE FORWARD TRANSMISSION DIFFUSER (Continued) 6-119

### *REMOVE IMPELLER*

2. **Remove retaining ring (4)** as follows:
   a. Insert screwdriver (5) in slot (6).
   b. Pull down on ring (4) to free it from teeth of locknut (7).
   c. Peel entire length of ring (4) from under locknut (7).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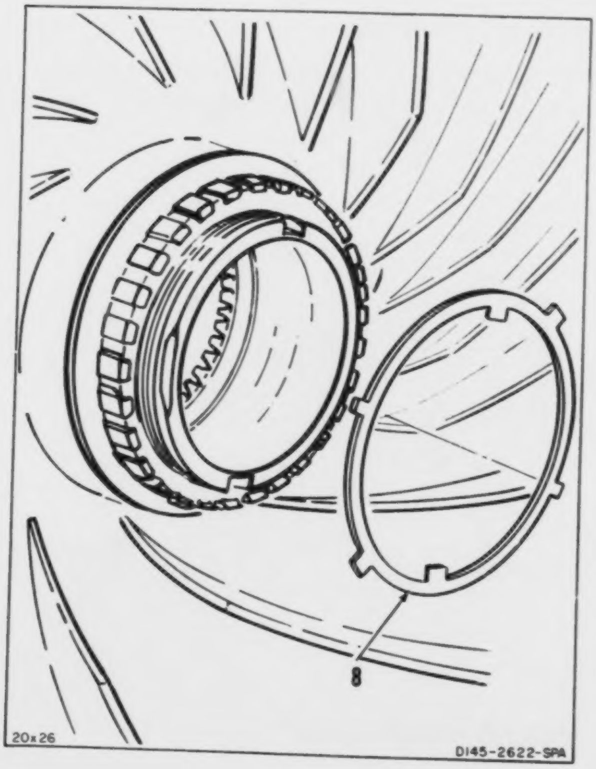
D145-2621-SPA

3. **Remove tangwasher (8).**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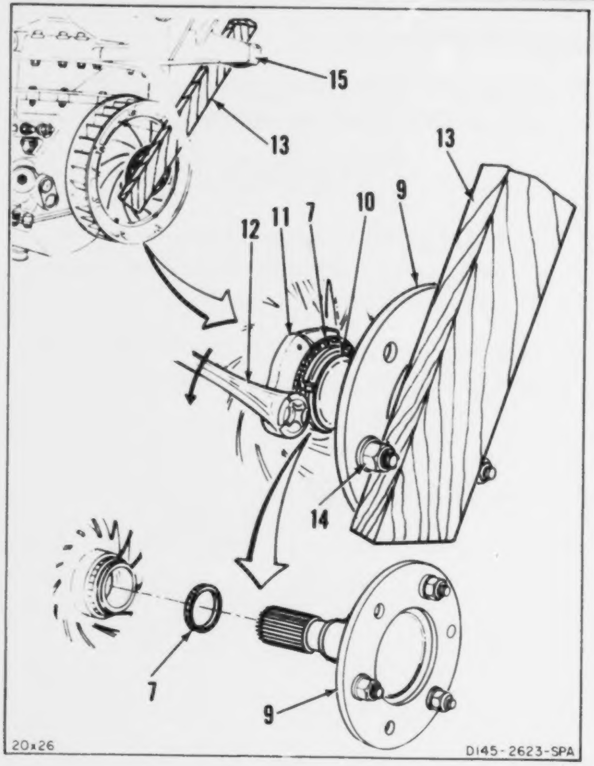
## 6-119 REMOVE FORWARD TRANSMISSION DIFFUSER (Continued) 6-119

4. **Remove locknut (7)** as follows:
   a. Install adapter assembly (9) in input shaft (10).
   b. Install spanner (11) and socket drive (12) on locknut (7).
   c. Place wood plank (13) across nuts (14) as shown.
   d. Brace plank (13) against transmission lug (15) to keep adapter assembly (9) from turning. Loosen locknut (7).
   e. Remove adapter assembly (9) and locknut (7).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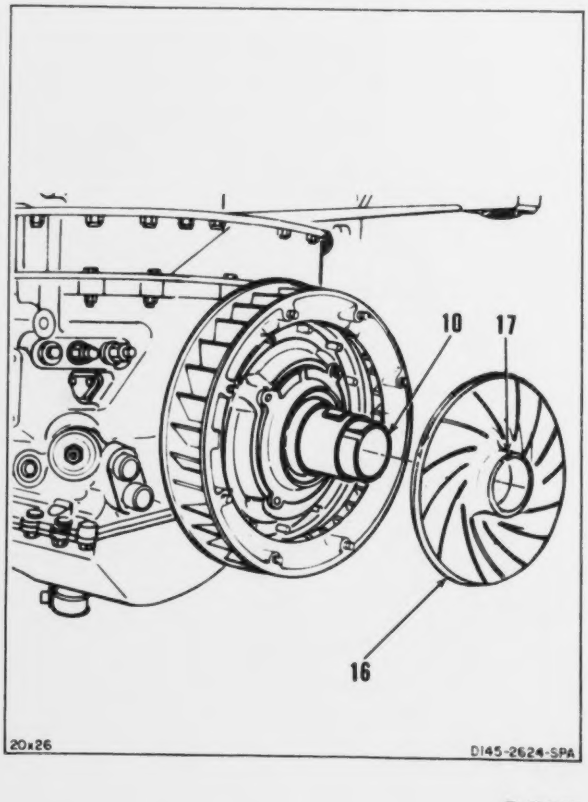
20x26
D145-2623-SPA

5. Rotate impeller (16) so that slot (17) is at top of shaft (10). **Remove impeller.**


10
17
16
20x26
D145-2624-SPA

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## 6-119 REMOVE FORWARD TRANSMISSION DIFFUSER (Continued) 6-119

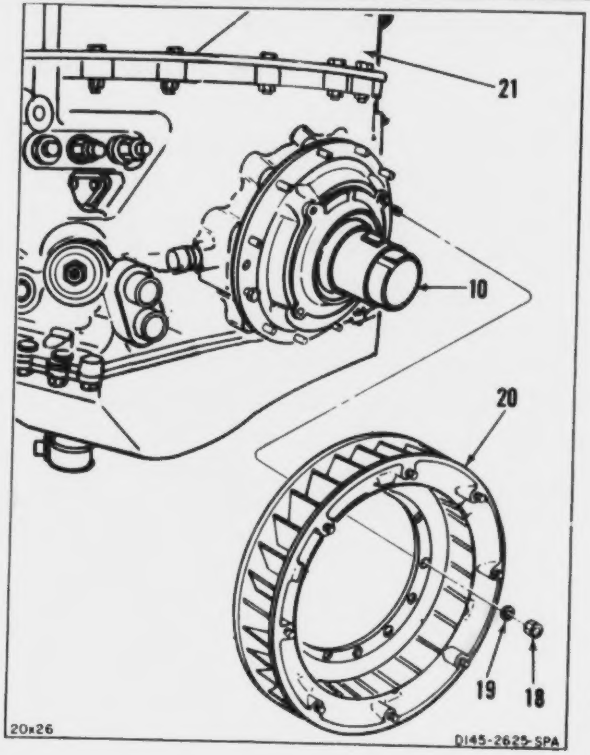
*REMOVE DIFFUSER*

6. Remove 12 nuts (18) and washers (19) from diffuser (20). **Remove diffuser.**

**CAUTION**

**Input shaft can fall out if washer and nut are not installed. Damage to input shaft will result.**

7. Install at least one washer (19) and nut (18) to hold input shaft (10) in transmission (21).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-120 INSTALL FORWARD TRANSMISSION DIFFUSER 6-120

INITIAL SETUP

***Applicable Configuration:***

All

***Tools:***

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Spanner Wrench
- Torque Wrench, 30 to 150 Inch-Pounds
- Torque Wrench, 150 to 750 Inch-Pounds
- Torque Wrench, 0 to 600 Foot-Pounds
- Wood Plank, 2 Inches x 4 Inches x 36 Inches
- Forward Transmission Input Shaft Adapter Assembly
- Rawhide Mallet

***Materials:***

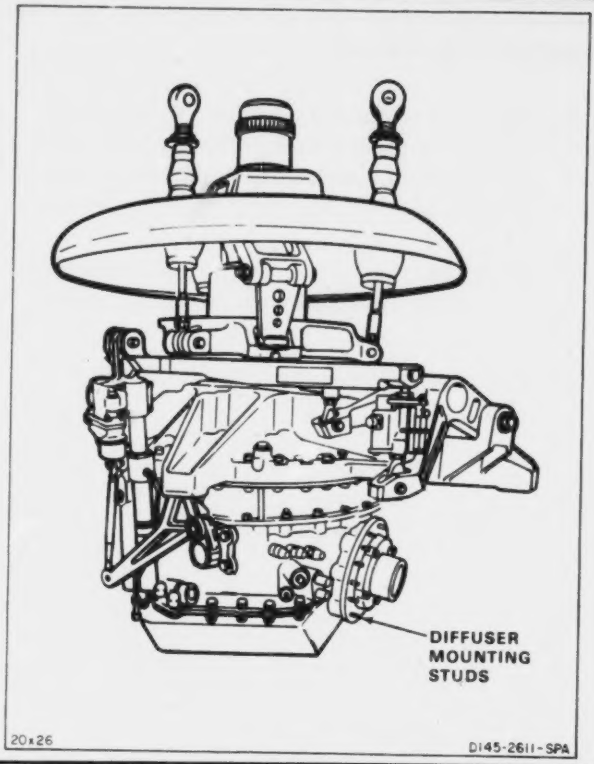
- Grease (E190)
- Oil (E254)

***Personnel Required:***

- 67U10 Medium Helicopter Repairer
- 67U20 Medium Helicopter Repairer
- 67U30 Inspector

***References:***

TM 55-1520-240-23P



### *INSTALL DIFFUSER*

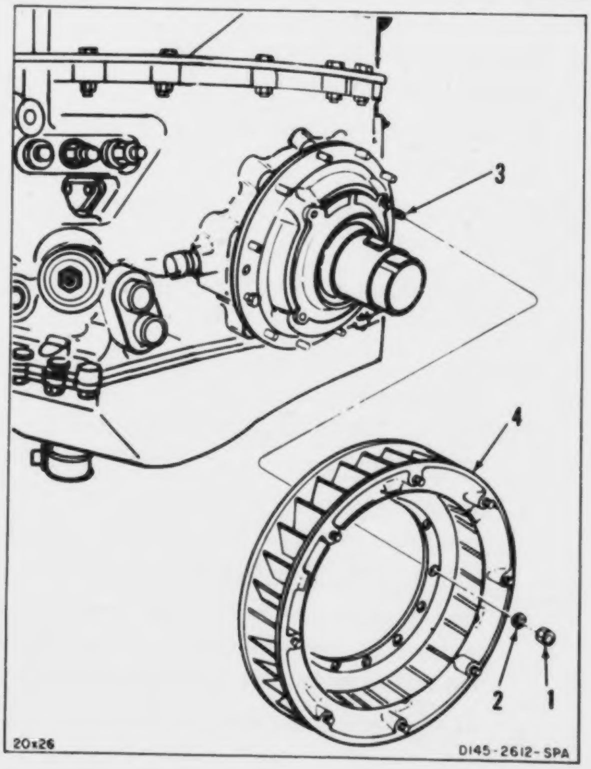
1. Remove nuts (1) and washers (2) from studs (3).

**NOTE**

Studs are not equally spaced. Diffuser fits on studs only one way.

2. **Install diffuser (4)** on studs (3). Install 12 washers (2) and nuts (1). **Torque nuts to 170 inch-pounds.**

### *INSPECT*



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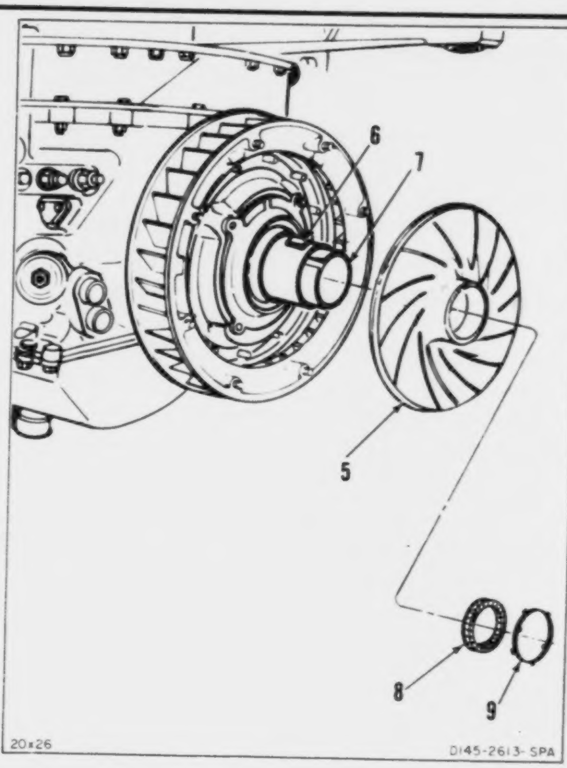
## 6-120 INSTALL FORWARD TRANSMISSION DIFFUSER (Continued) 6-120

### *INSTALL IMPELLER*

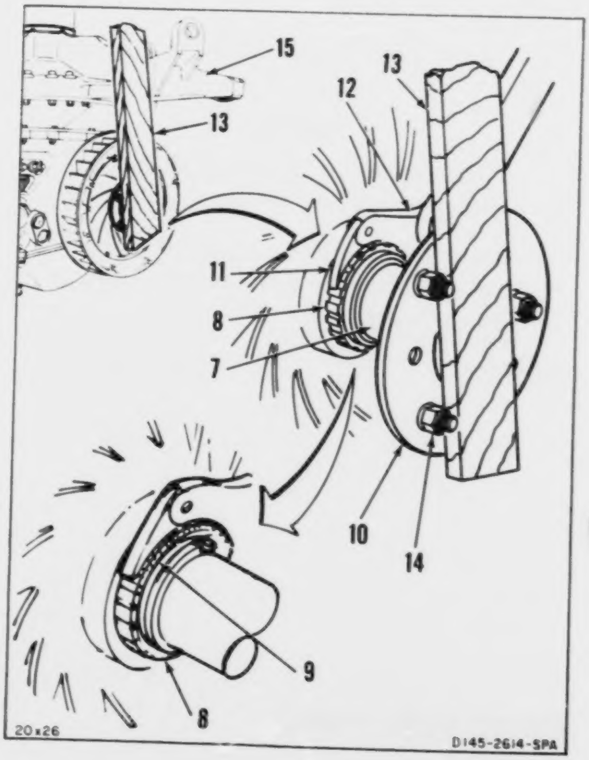
3. Coat bore of impeller (5), key (6), and input shaft (7) with oil (E254). Align impeller with key. **Install impeller** over input shaft. Use mallet.

4. Apply light coat of grease (E190) to thread of locknut (8). Loosely install locknut on shaft (7).

5. **Position tangwasher (9)** over shaft (7).



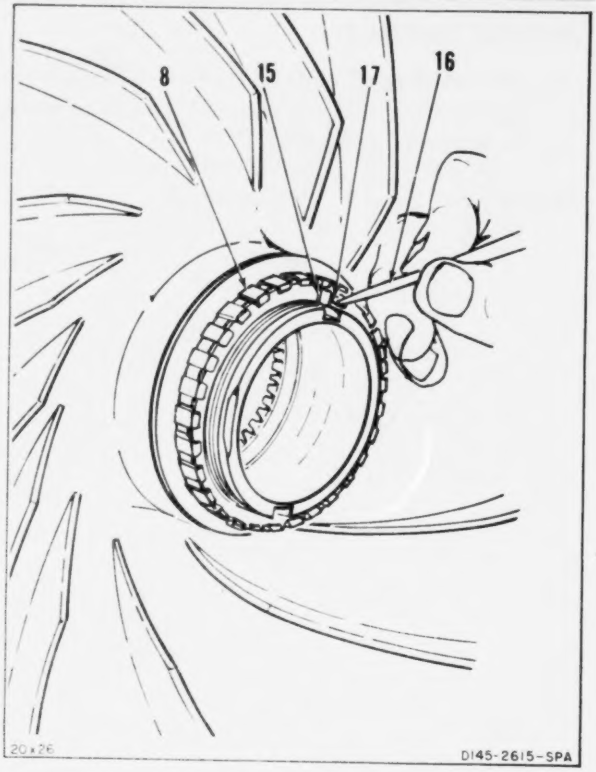
6. **Torque locknut (8) and install tangwasher (9)** as follows:
   a. Install adapter assembly (10) in input shaft (7).
   b. Install spanner (11) and torque wrench (12) on locknut (8).
   c. Place wood plank (13) across nuts (14) as shown.
   d. Brace plank (13) against transmission lug (15) to keep adapter assembly (10) from turning. **Torque locknut (8) to 145 foot-pounds.**
   e. Install tangwasher (9) on locknut (8). If tangs do not align with slots in nut, rotate tangwasher 180 degrees and install.
   f. If tangs do not align, increase torque on locknut (8) in small steps until tangs align. **Do not torque over 155 foot-pounds.**
   g. Remove adapter and plate assembly (10).



***GO TO NEXT PAGE***

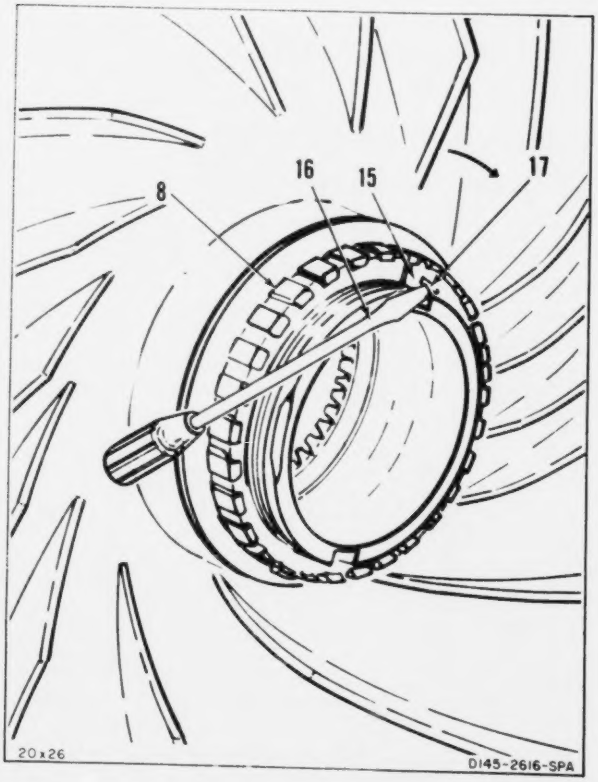
## 6-120 INSTALL FORWARD TRANSMISSION DIFFUSER (Continued) 6-120

7. **Install retaining ring (15)** as follows:
   a. Install end of retaining ring (15) under teeth of locknut (8).
   b. Install entire length of retaining ring (15) under teeth of locknut (8). Compress end of ring as needed to install under locknut. Use thin screwdriver (16) inserted in slot (17).


8
15
17
16
20x26
D145-2615-SPA

   c. Install edge of screwdriver (16) in slot (17) and push retaining ring (15) clockwise. Ring shall expand under teeth of locknut (8) to lock.

***INSPECT***


8
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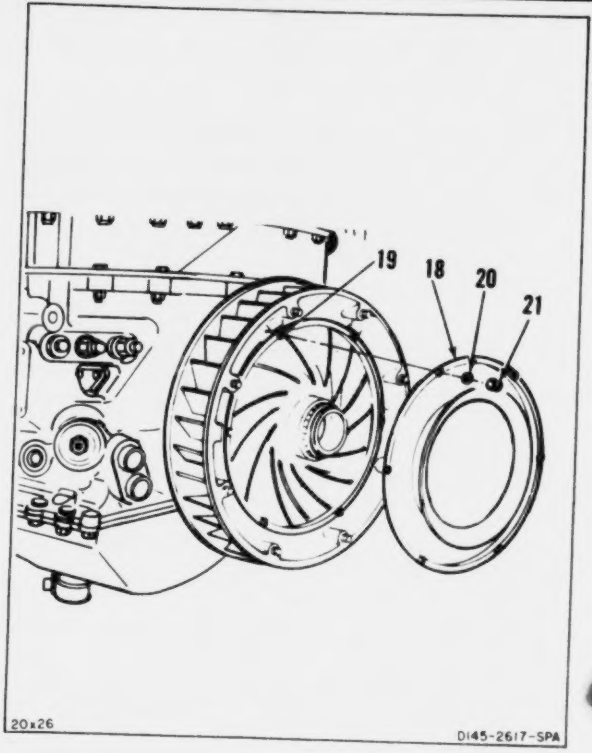
20x26
D145-2616-SPA

***GO TO NEXT PAGE***

## 6-120 INSTALL FORWARD TRANSMISSION DIFFUSER (Continued) 6-120

*INSTALL SHROUD*

8. **Install shroud (18)** on six studs (19). Install six washers (20) and nuts (21). **Torque nuts to 60 inch-pounds.**


19
18
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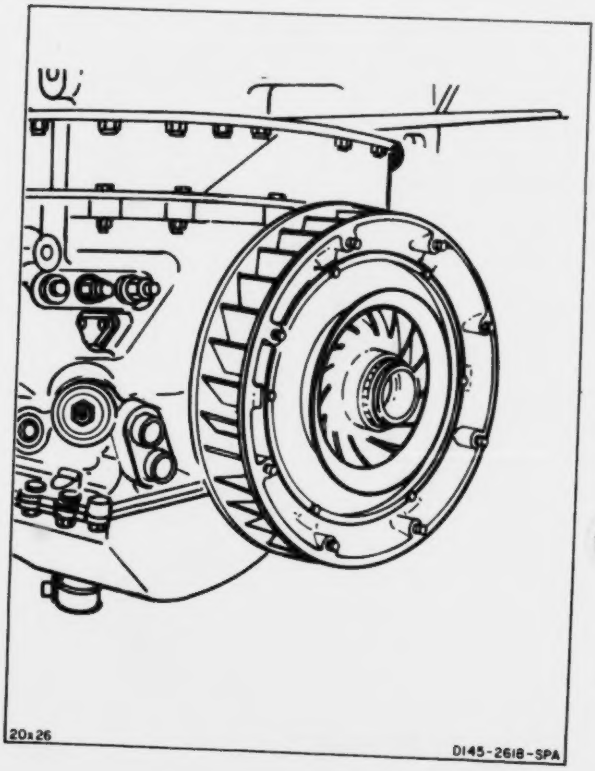
20x26
D145-2617-SPA

*INSPECT*


20x26
D145-2618-SPA

FOLLOW-ON MAINTENANCE:

Install oil cooler (Task 6-114).

**END OF TASK**

## 6-121 REMOVE FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT

INITIAL SETUP

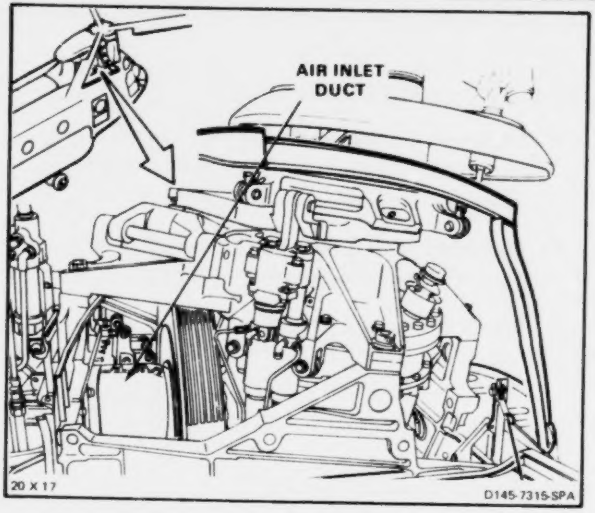
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
None

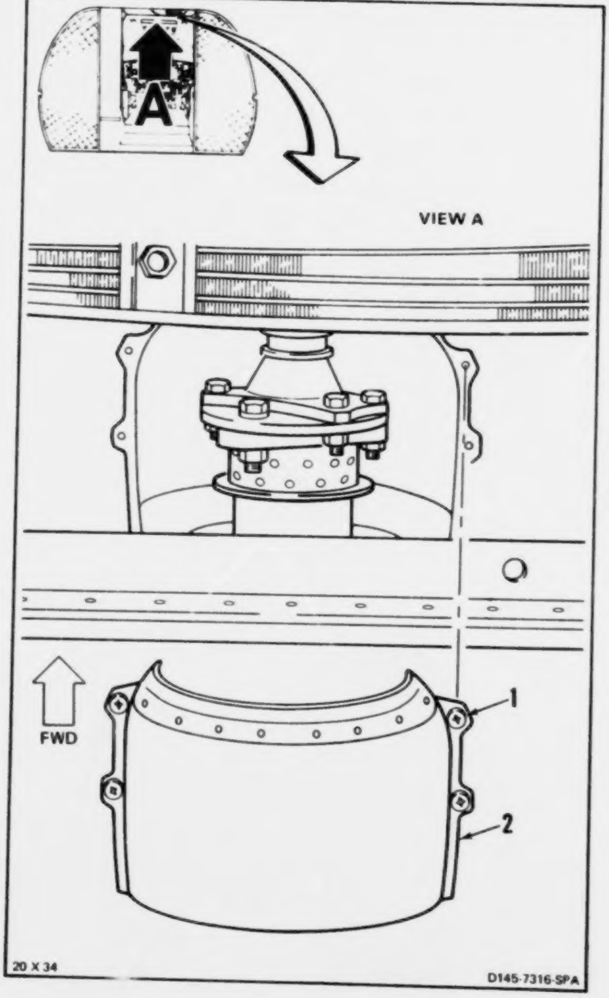
***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Forward Transmission Fairing Work Platforms Open (Task 2-2)


AIR INLET DUCT
20 X 17
D145-7315-SPA

### *REMOVE BOTTOM SEGMENT*

1. Loosen two turnlock fasteners (1) at each side of bottom segment (2).
2. **Remove segment (2).**

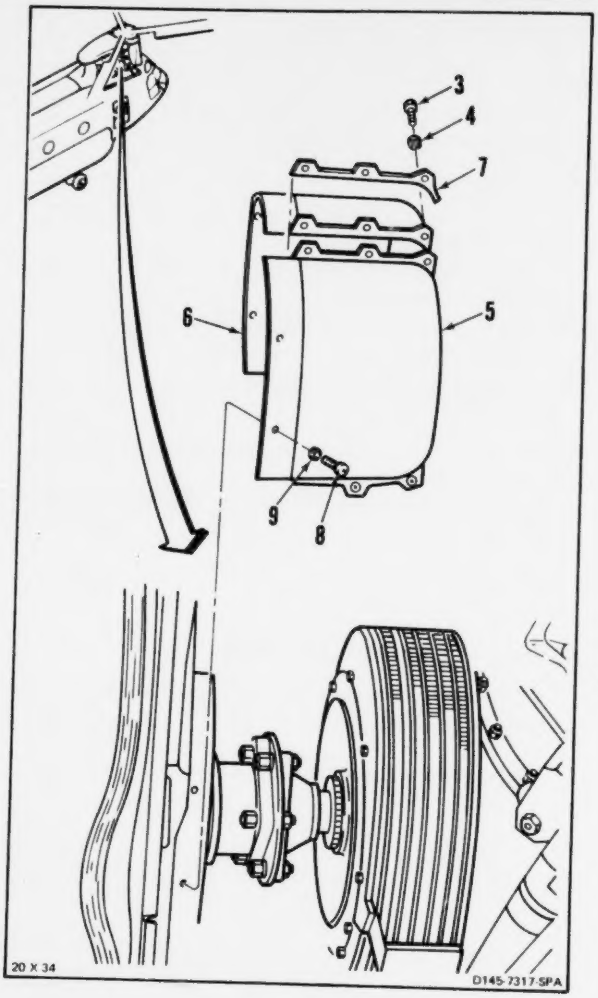

A
VIEW A
1
2
FWD
20 X 34
D145-7316-SPA

***GO TO NEXT PAGE***

## 6-121 REMOVE FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued) 6-121

### *REMOVE TOP SEGMENTS*

3. **Remove three bolts (3)** and washers (4) connecting right segment (5) and left segment (6). **Remove shims (7).**
4. **Remove four bolts (8)** and washers (9) from aft end of segments (5 and 6).
5. **Remove segments (5 and 6).**



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT 6-122

INITIAL SETUP

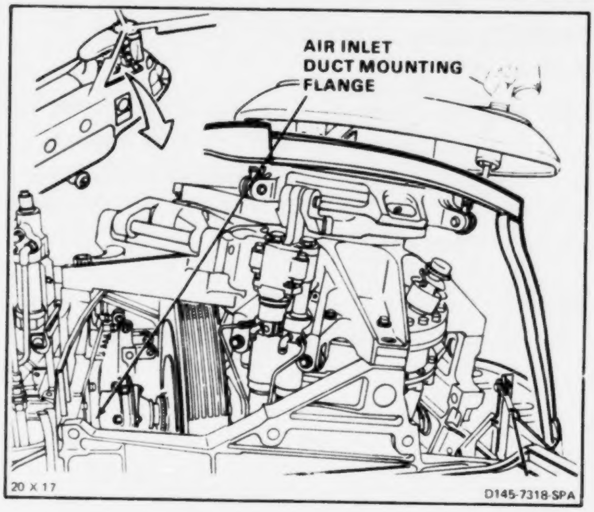
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Drill Motor
Twist Drill, 7/32-Inch

***Materials:***
Marking Pencil (E271)

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector
68G10 Aircraft Structural Repairer

***References:***
TM 55-1520-240-23P


AIR INLET DUCT MOUNTING FLANGE
20 X 17
D145-7318-SPA

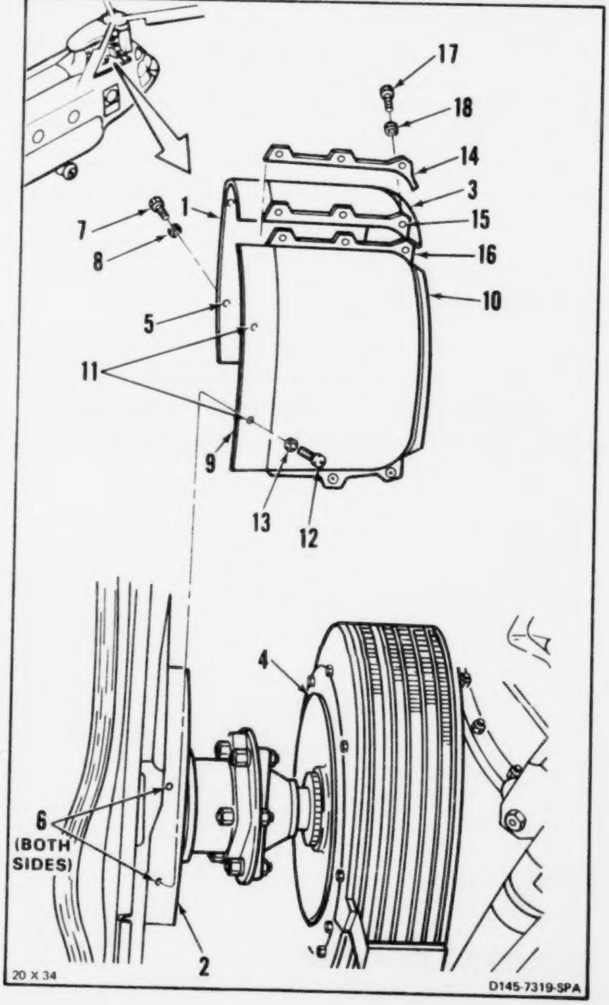
**NOTE**

If installing a new duct, go to step 7.

***INSTALL REMOVED TOP SEGMENTS***

1. **Position top left segment (1)** on airframe mounting flange (2) with seal (3) against shroud (4). **Align two holes (5)** in segment with holes (6) on left side of flange (2). **Loosely install two bolts (7)** and washers (8).
2. **Position top right segment (9)** on airframe mounting flange (2) with seal (10) against shroud (4). **Align two holes (11)** in segment with holes (6) on right side of flange (2). **Loosely install two bolts (12)** and washers (13).
3. **Install shims (14)** between mating flanges (15 and 16). **Install three bolts (17)** and washers (18).
4. **Tighten four bolts (7 and 12).**

***INSPECT***


17
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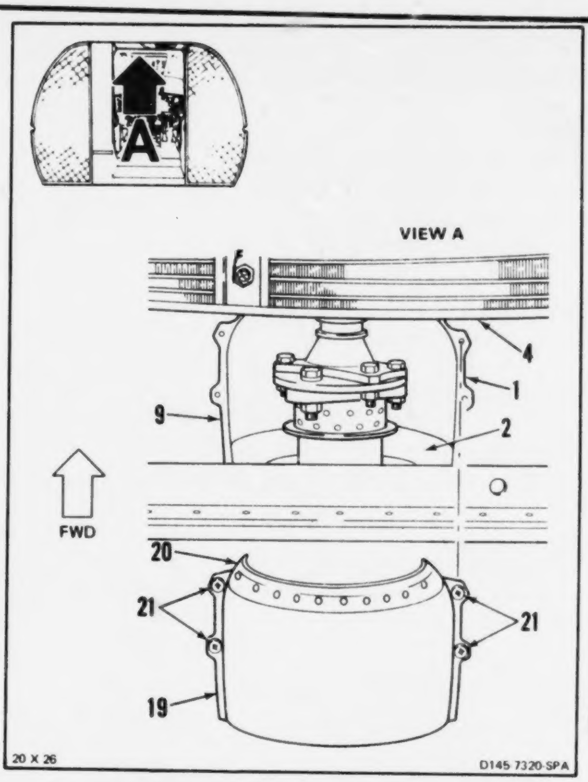
9
13
12
4
6 (BOTH SIDES)
2
20 X 34
D145-7319-SPA

***GO TO NEXT PAGE***

## 6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued) 6-122

### *INSTALL REMOVED DUCT BOTTOM SEGMENT*

5. **Position bottom segment (19)** on airframe mounting flange (2) with seal (20) against shroud (4). **Install segment** on top left segment (1) and top right segment (9) **with four fasteners (21).**


A
VIEW A
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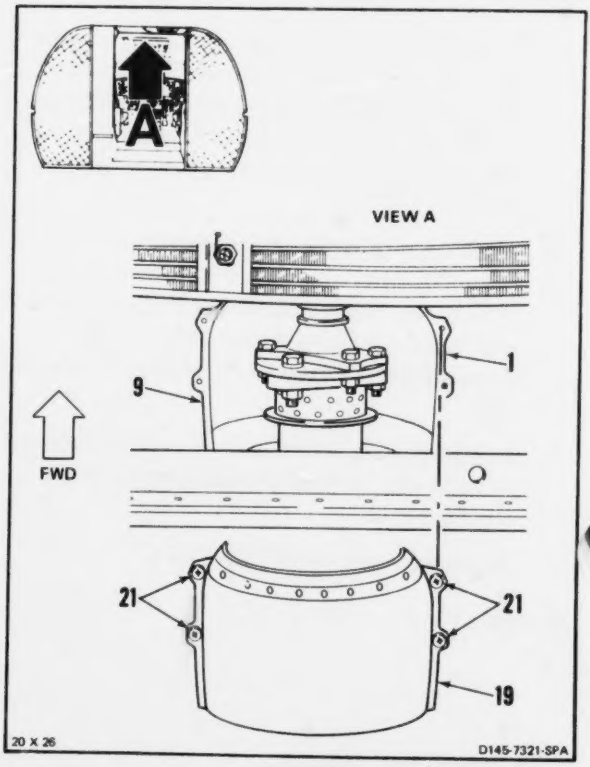
9
2
FWD
20
21
21
19
20 X 26
D145-7320-SPA

### *INSPECT*

6. Go to FOLLOW-ON MAINTENANCE.

### *INSTALL NEW DUCT*

7. Loosely assemble three segments (1, 9, and 19) around airframe mounting flange (2). **Install bottom segment (19) on top segments (1 and 9) with four fasteners (21).**


A
VIEW A
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20 X 26
D145-7321-SPA

***GO TO NEXT PAGE***

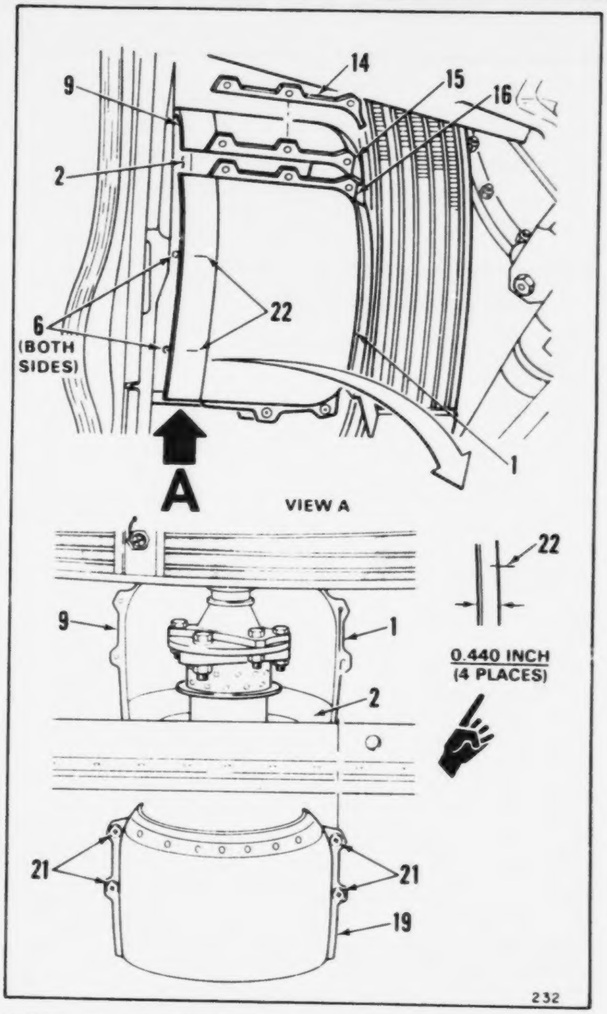
## 6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued) 6-122

8. Position three segments (1, 9, and 19) so that flanges (15 and 16) of segments (1 and 9) point straight up. **Install** enough **shims (14)** between flanges to give a snug fit of three segments against mounting flange (2).

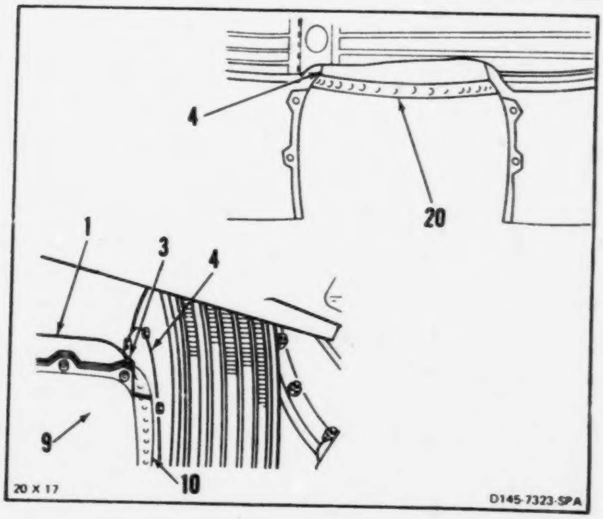
**NOTE**

About five shims are needed for snug fit.

9. Move three segments (1, 9, and 19) forward just enough to **uncover four mounting holes (6)** in mounting flange (2). Make sure flanges (15 and 16) point straight up. **Mark centerline (22) of four holes on segments (1 and 9)** with pencil (E271).
10. Release four fasteners (21). **Remove three segments (1, 9, and 19).**
11. **Measure 0.440 inch in** from edge of two top sections (1 and 9) at each pencil mark (22). **Drill one 0.220 inch hole** at that point on each mark.
12. Position three segments (1, 9, and 19) around mounting flange (2). **Fasten bottom segment (19) to two top segments (1 and 9)** with four fasteners (21).



13. **Check** that **seals (3, 10, and 20)** at forward end of three segments (1, 9 and 19) fit against shroud (4) and do not overlap. **Trim seals as needed. Gap between seals shall not exceed 0.06 inch.**



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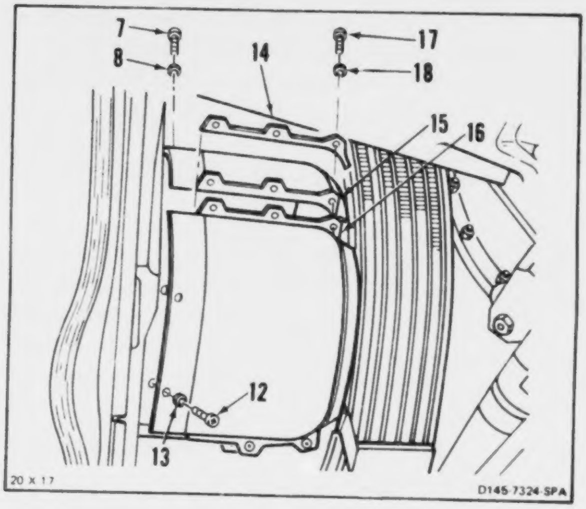
## 6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued) 6-122


7
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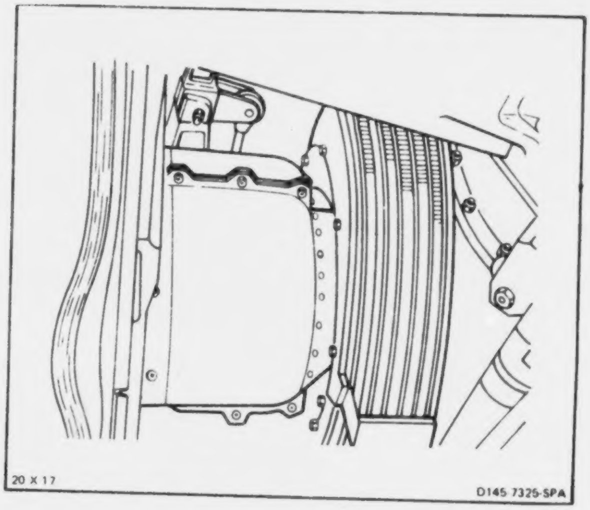
12
13
20 X 17
D145-7324-SPA

14. **Install shims (14)** between flanges (15 and 16). **Install three bolts (17)** and washers (18).

15. **Install two bolts (7)** and washers (8). **Install two bolts (12)** and washers (13).

***INSPECT***


20 X 17
D145-7325-SPA

FOLLOW-ON MAINTENANCE:

Close forward transmission fairing work platforms (Task 2-2).

Install forward transmission drip pan (Task 2-3).

**END OF TASK**

## 6-123 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER ELEMENT 6-123

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4962
Container, Two Quart
Torque Wrench, 30 to 150 Inch-Pounds

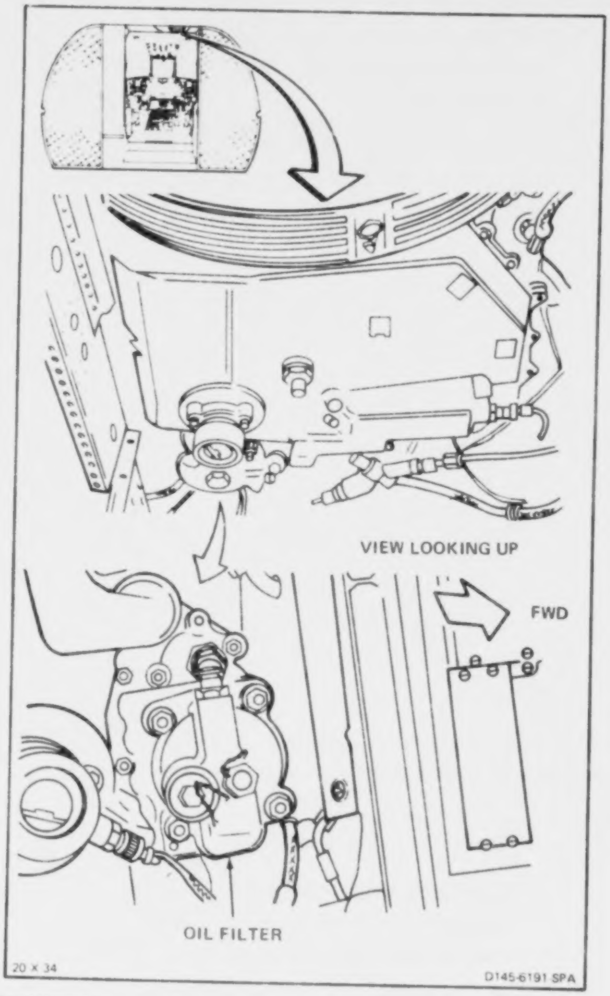
***Materials:***
Lockwire (E230)
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

***Parts:***
Packings
Filter Element

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)

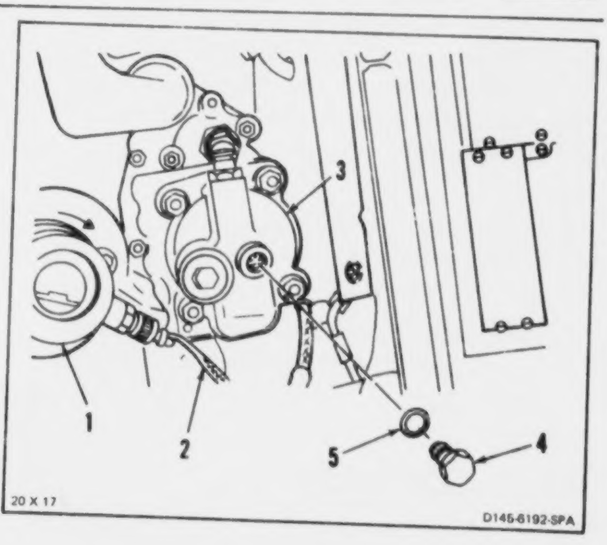


### *REMOVE ELEMENT*

**NOTE**

Filter housing holds about 1 pint.

1. Turn detection screen cap (1) to move wire (2) away from filter housing (3).
2. Remove lockwire from **drain plug (4).** Remove plug and packing (5). **Drain oil.** Use container to catch oil.
3. Loosely install drain plug (4) and packing (5) in housing (3).



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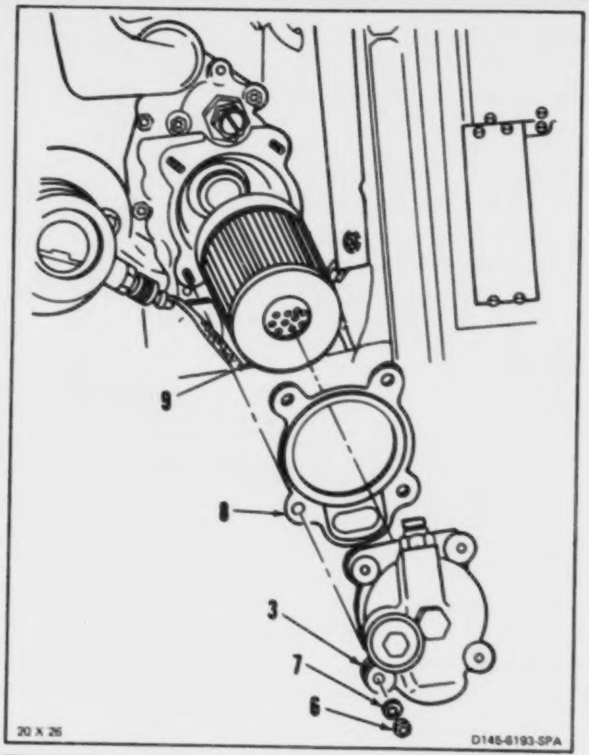
## 6-123 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER ELEMENT (Continued) 6-123

4. Remove four nuts (6) and washers (7). **Remove** housing (3), gasket seal (8), and **element (9).**
5. Check outside of element (9) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-112).

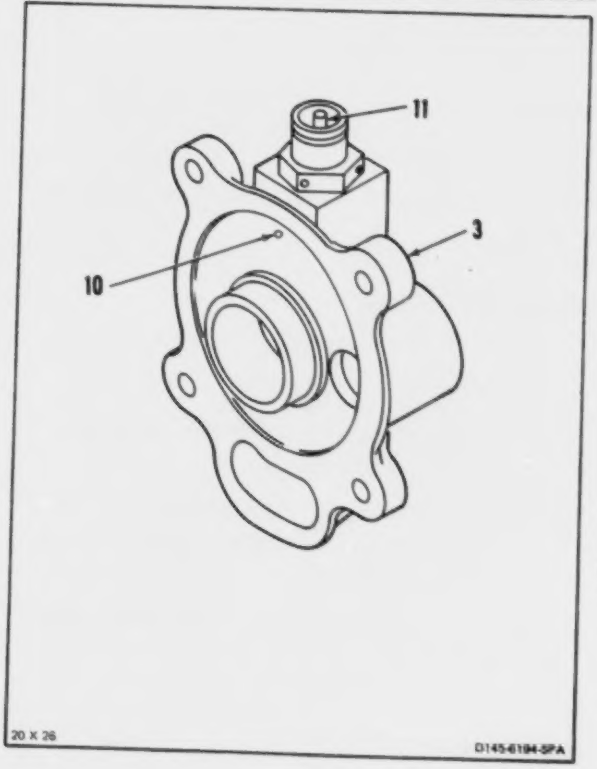


### *INSTALL ELEMENT*

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

6. Clean inside of housing (3) with solvent (E162) and clean cloths (E120). Wear gloves (E186). Check that hole (10) is free of debris.
7. Hold housing (3) so that indicating button (11) points straight up. **Push in button** to lock it down.



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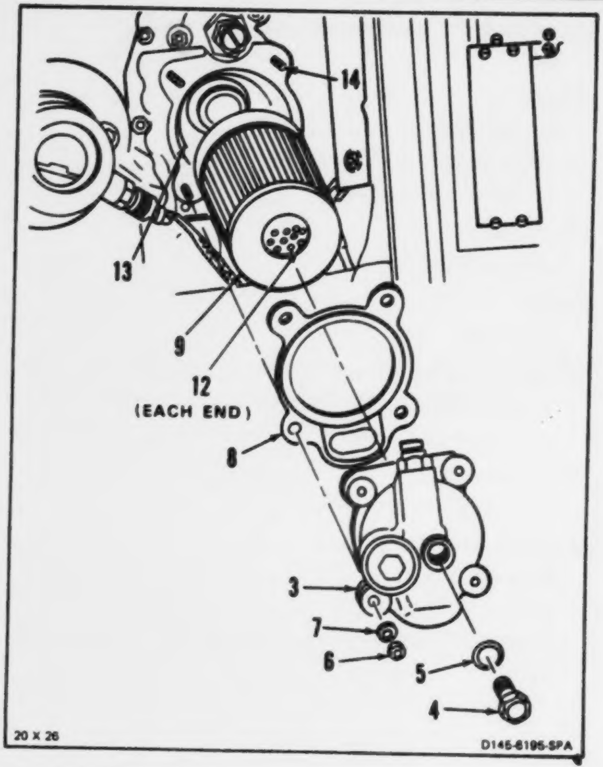
## 6-123 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER ELEMENT (Continued) 6-123



**NOTE**

Packings are supplied with element.
Do not reuse removed element.

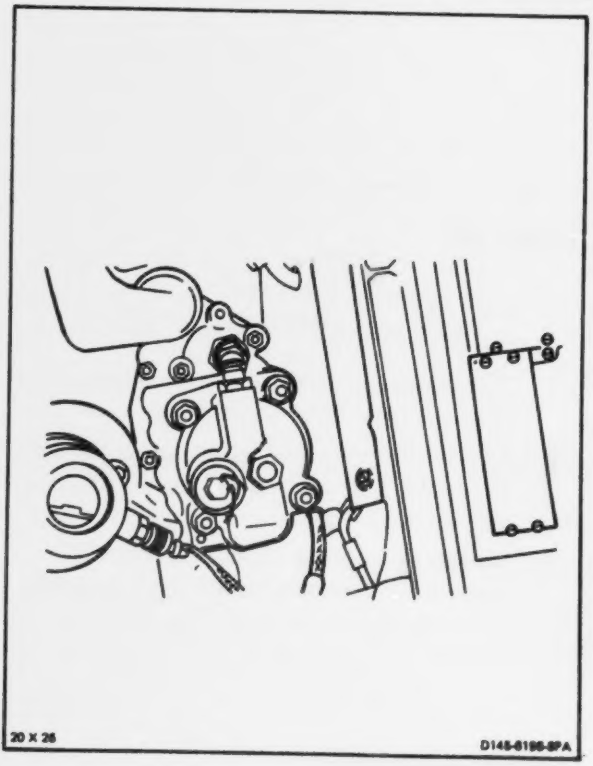
8. **Install element (9),** with packings (12), in pump (13).
9. **Install gasket seal (8) and housing (3)** on four studs (14). Install four washers (7) and nuts (6). **Torque nuts to 60 inch-pounds.**
10. If housing (3) is not a replacement, remove drain plug (4) and packing (5). Install plug and new packing. Lockwire plug to housing (3). Use lockwire (E230).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Install forward transmission drip pan (Task 2-3).



**END OF TASK**

## 6-123.1 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR 6-123.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, Two-Quart

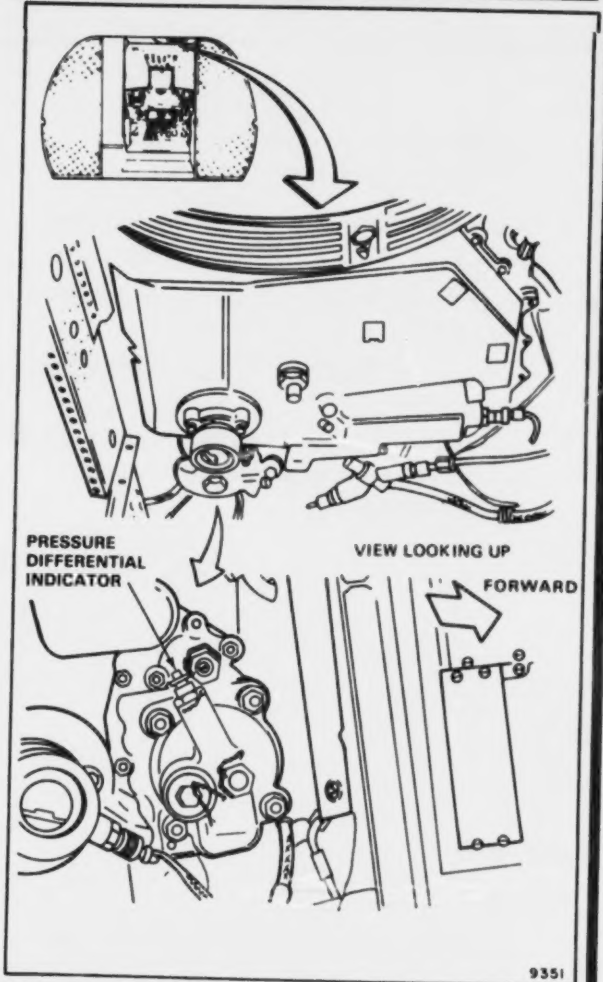
***Materials:***
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)

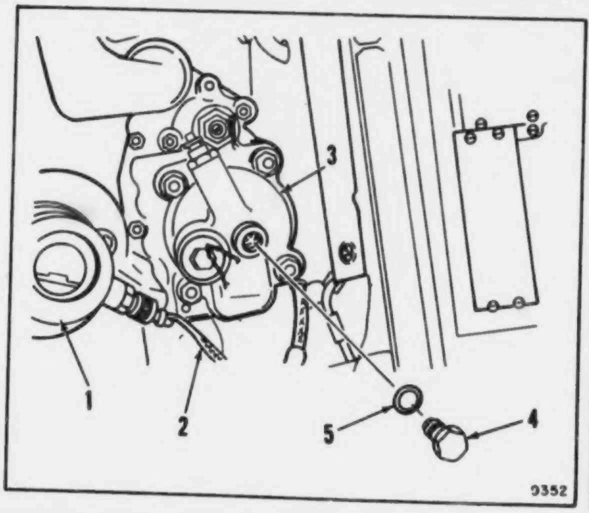


### DRAIN OIL

**NOTE**

Filter housing holds about 1 pint.

1. Turn detection screen cap (1) to move wire (2) away from filter housing (3).
2. Remove lockwire from **drain plug (4).** Remove plug and packing (5). **Drain oil.** Use container to catch oil.
3. **Install drain plug (4)** and packing (5) in housing (3). **Torque to 80 inch-pounds.** Lockwire plug to housing. Use lockwire (E231).



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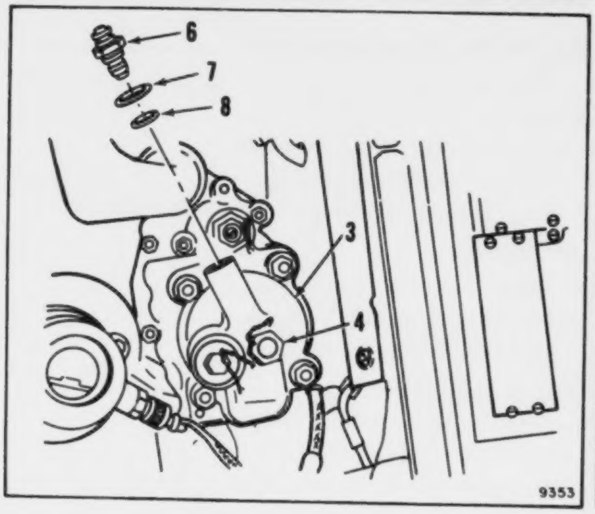
## 6-123.1 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued) 6-123.1

4. Lockwire plug (4) to housing (3). Use lockwire (E231).



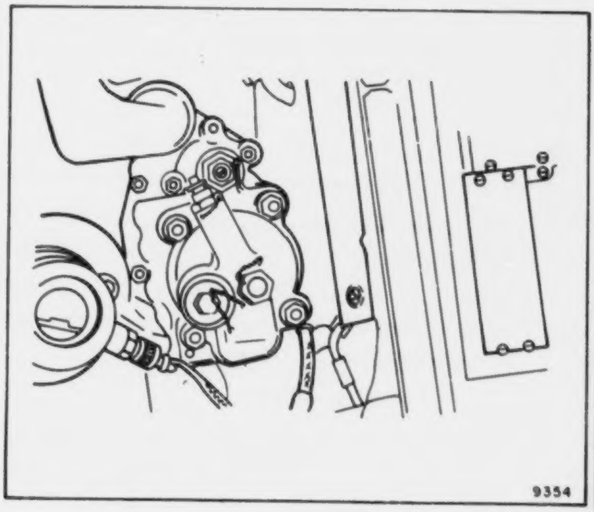
***REMOVE INDICATOR***

5. Remove lockwire from pressure differential indicator (6). **Remove indicator** from housing (3).
6. **Remove two packings (7 and 8)** from indicator (6).

***INSTALL INDICATOR***

7. **Install two packings (7 and 8)** on indicator (6).
8. Hold indicator (6) so that button (9) points up. **Check that button is pushed in** and locked.
9. **Install indicator (6)** in housing (3).
10. Lockwire indicator (6) to housing (3). Use lockwire (E231).

***INSPECT***



FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Install forward transmission drip pan (Task 2-3).

**END OF TASK**

## 6-124 REMOVE FORWARD TRANSMISSION MAIN OIL PUMP 6-124

INITIAL SETUP

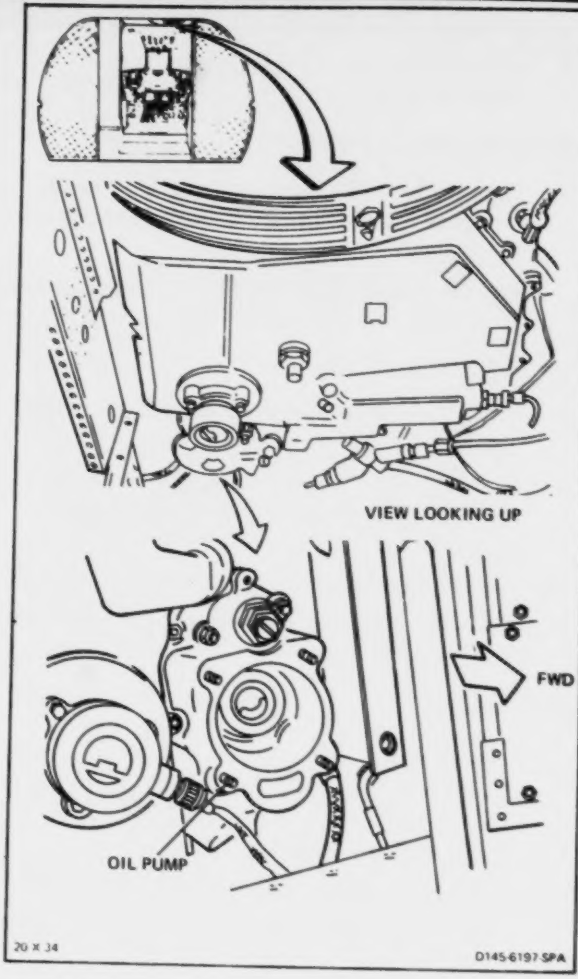
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Bolt, 1/4-24, 1 1/4-Inch Thread Length (2)

***Materials:***
None

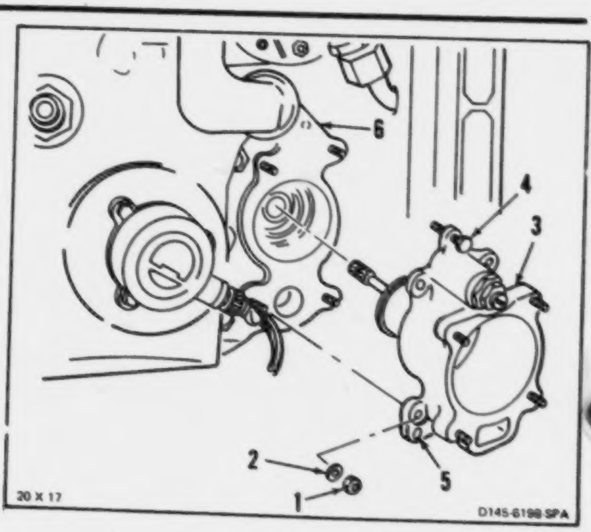
***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)
Oil Filter Element Removed (Task 6-123)


VIEW LOOKING UP
FWD
OIL PUMP
20 X 34
D145-6197-SPA

---

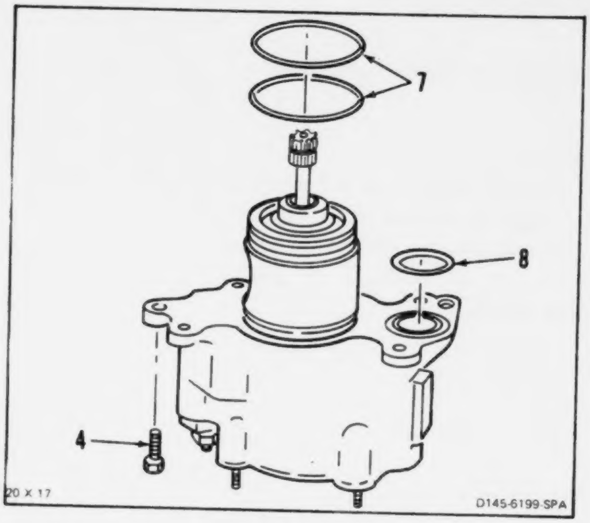
1. **Remove four nuts (1)** and washers (2) from pump (3).
2. Install two 1/4-24 bolts (4) in two mounting flange holes (5). Turn bolts to jack pump out of transmission (6). **Remove pump.**


6
4
3
2
5
1
20 X 17
D145-6198-SPA

*GO TO NEXT PAGE*

## 6-124 REMOVE FORWARD TRANSMISSION MAIN OIL PUMP (Continued) 6-124

3. Remove two bolts (4). Remove two packings (7) and packing (8).


7
8
4
20 X 17
D145-6199-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-125 INSTALL FORWARD TRANSMISSION MAIN OIL PUMP 6-125

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

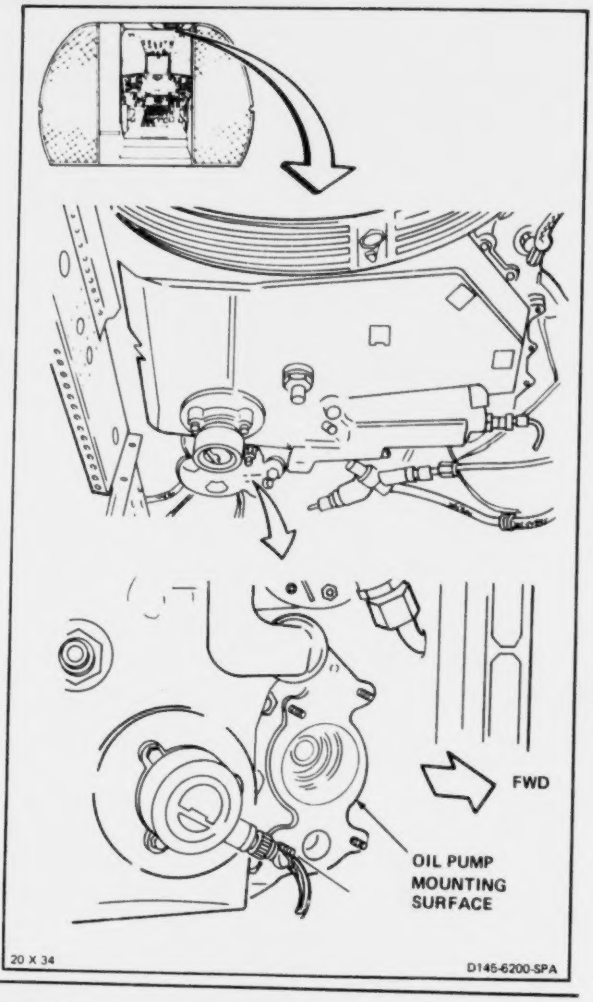
***Materials:***
None

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

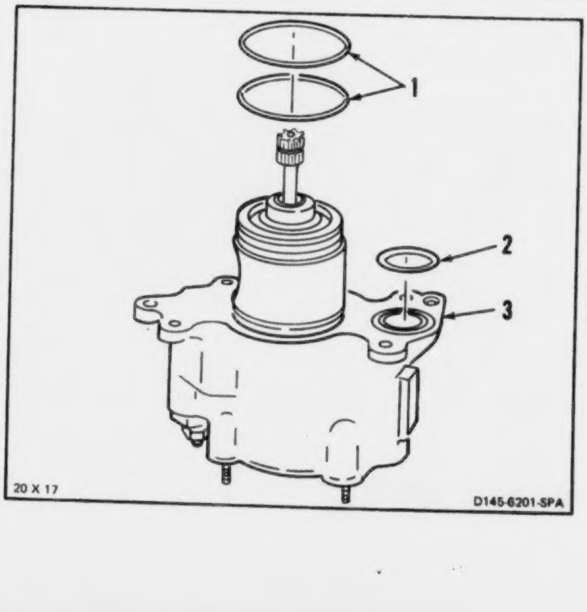
***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Tiedown Line Installed on One Forward Blade (Task 1-26)


FWD
OIL PUMP MOUNTING SURFACE
20 X 34
D145-6200-SPA

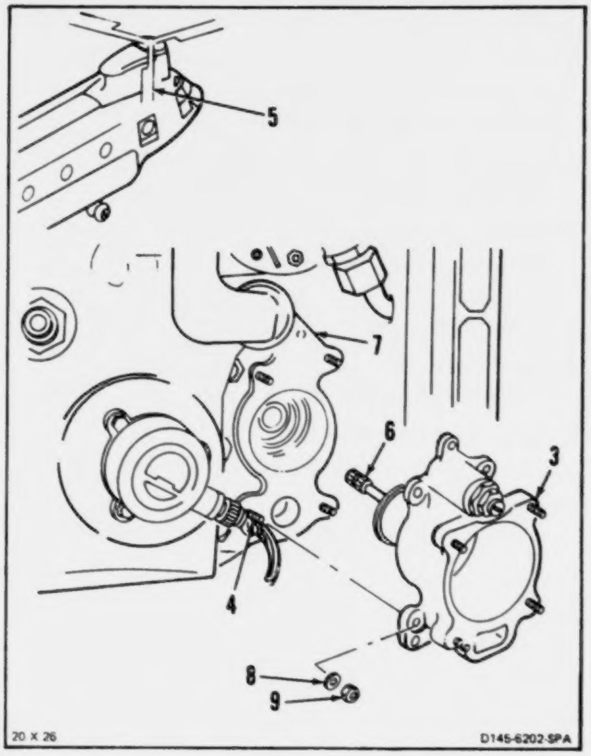
### *INSTALL PUMP*

1. Install two packings (1) and packing (2) in pump (3).


1
2
3
20 X 17
D145-6201-SPA

***GO TO NEXT PAGE***

## 6-125 INSTALL FORWARD TRANSMISSION MAIN OIL PUMP (Continued) 6-125



**NOTE**

If pump binds during installation, it may be necessary to remove it and start again. Use soft-faced mallet to release a binding pump.

2. **Install pump (3)** slowly and carefully on four studs (4). Have helper turn blade (5) as needed during installation so that splined shaft (6) can be installed in transmission (7).

**NOTE**

It may be necessary to draw pump against transmission with nuts before installing washers and nuts.

3. Install four washers (8) and nuts (9). **Torque nuts** to **60 inch-pounds.**

***INSPECT***

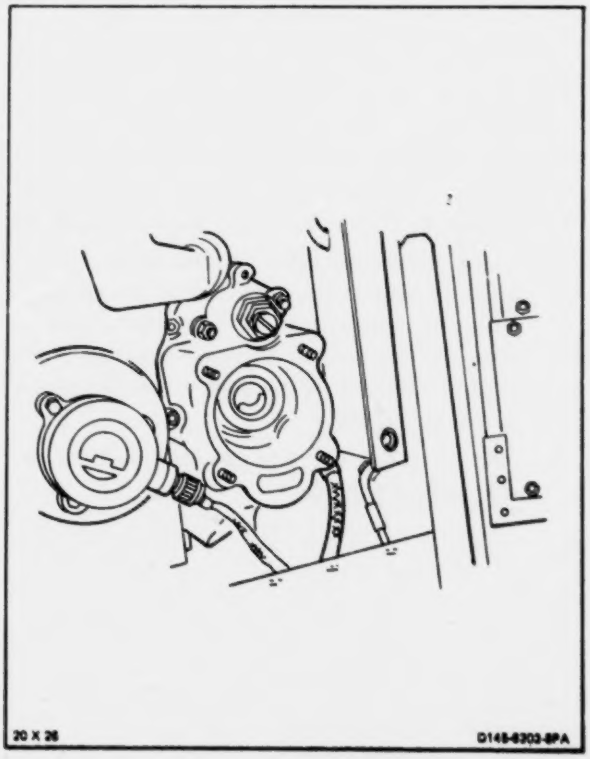
FOLLOW-ON MAINTENANCE:

Install oil filter element (Task 6-123).

Service forward transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

Install forward transmission drip pan (Task 2-3).



**END OF TASK**

## 6-126 ADJUST FORWARD TRANSMISSION MAIN OIL PUMP 6-126

INITIAL SETUP

***Applicable Configurations:***
All

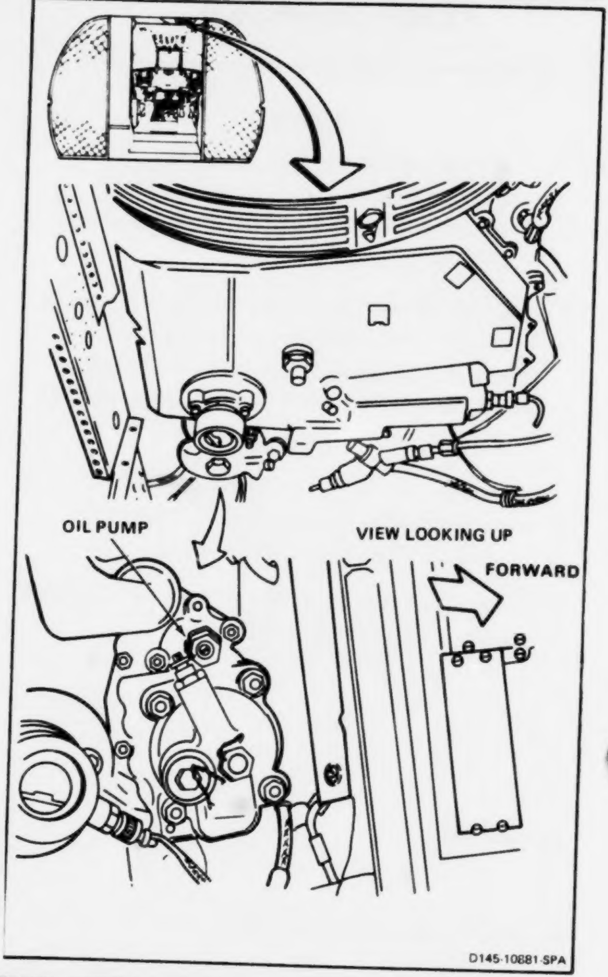
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Lockwire (E230)

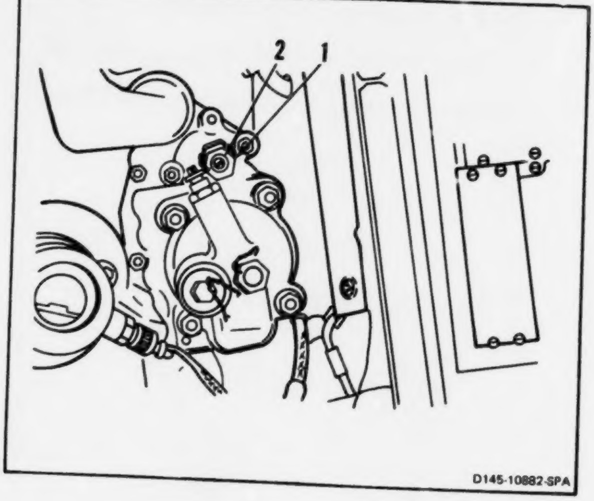
***Personnel Required:***
Medium Helicopter Repairer
Inspector
Army Rotary-Wing Aviator (2)

***References:***
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3)

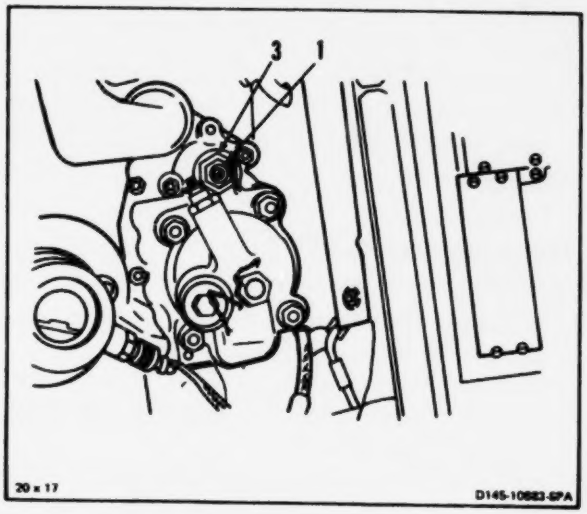


1. Remove lockwire from locknut (1). Hold setscrew (2) from turning and **loosen locknut.**
2. **Turn setscrew (2) no more than 1/4 turn to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. **Required gage pressure is 40 to 70 psi.**
3. Hold setscrew (2). **Torque locknut (1) to 60 inch-pounds**.



**GO TO NEXT PAGE**

## 6-126 ADJUST FORWARD TRANSMISSION MAIN OIL PUMP (Continued) 6-126



4. Have pilot perform ground run at 100 percent rotor rpm until transmission temperature and pressure stabilize. **Record forward transmission oil pressure.**
5. If oil pressure is 40 to 70 psi, go to step 6. **If oil pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) to retaining nut (3). Use lockwire (E230).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan (Task 2-3).

**END OF TASK**

## 6-127 REMOVE FORWARD TRANSMISSION AUXILIARY OIL PUMP 6-127

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Powertrain Tool Kit, NSN 5180-00-323-5267
Bolt, 1/4-28, 3-Inches Long (2)

***Materials:***
None

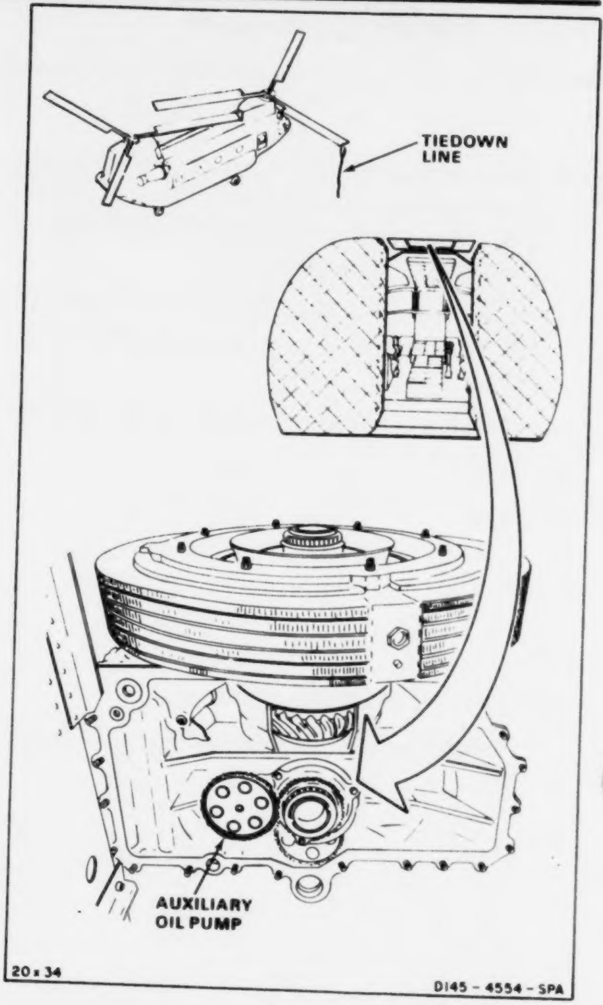
***Personnel Required:***
Aircraft Powertrain Repairer (2)

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission Drip Pan Removed (Task 2-3).
Forward Transmission Sump Removed (Task 6-33)
Tiedown Line Installed On One Forward Blade (Task 1-26)

***General Safety Instructions:***

**WARNING**

**Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.**



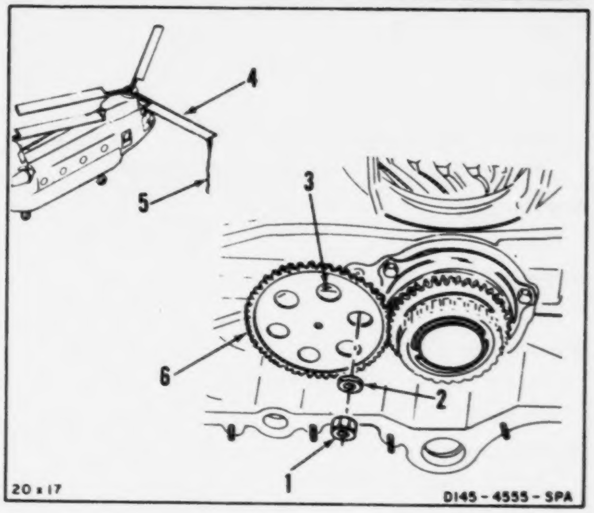
GO TO NEXT PAGE

## 6-127 REMOVE FORWARD TRANSMISSION AUXILIARY OIL PUMP (Continued) 6-127

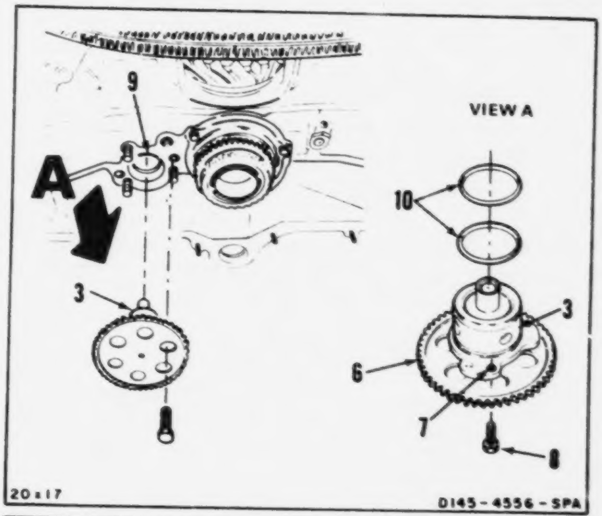
WARNING

**Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.**

1. **Remove three nuts (1)** and washers (2) from pump (3). Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with nuts.


4
5
3
6
2
1
20 x 17
D145-4555-SPA

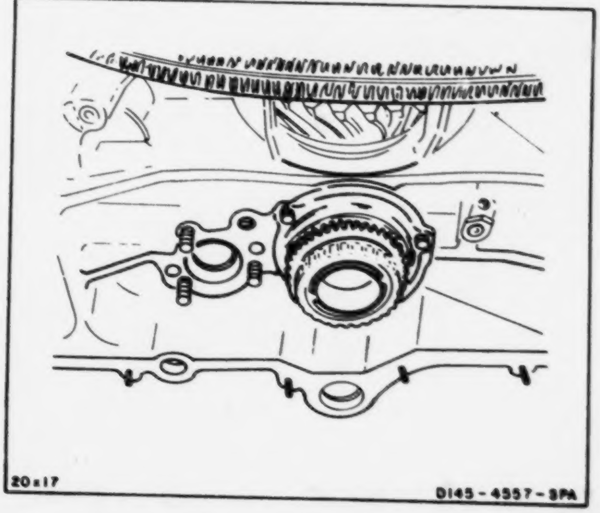
2. **Align access holes** in drive gear (6) with two threaded holes (7) in pump (3). **Install** 1/4-28 **bolt (8)** in each hole. Threaded length of bolts shall be at least 2 1/2-inches.
3. Turn bolts (8) until they bottom against transmission (9). Continue turning bolts one turn at a time to jack pump (3) out of transmission. Remove pump.
4. Remove two bolts (8) and packings (10) from pump (3).


9
VIEW A
A
10
3
3
6
7
8
20 x 17
D145-4556-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**


20 x 17
D145-4557-SPA

## 6-128 INSTALL FORWARD TRANSMISSION AUXILIARY OIL PUMP 6-128

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Tool Kit, NSN 5180-00-323-5267

Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***

None

***Parts:***

Packings

***Personnel Required:***

Aircraft Powertrain Repairer (2)

Inspector

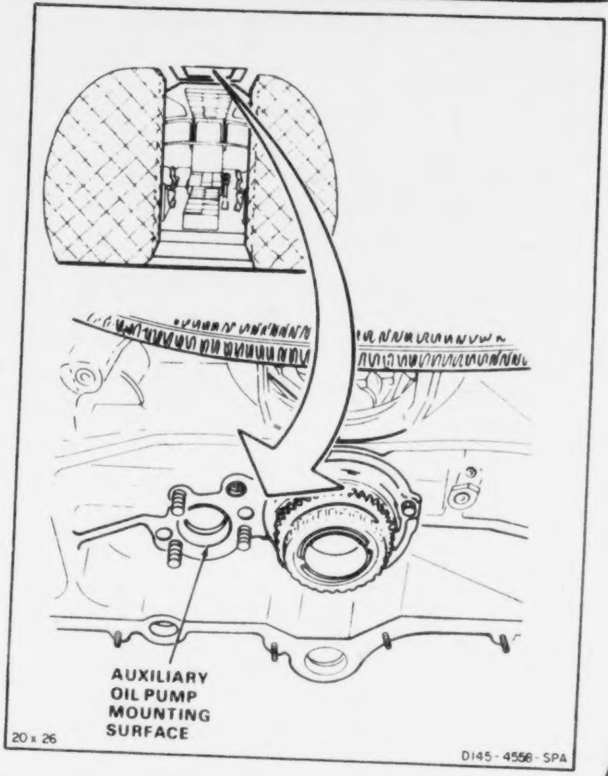
***References:***

TM 55-1520-240-23P

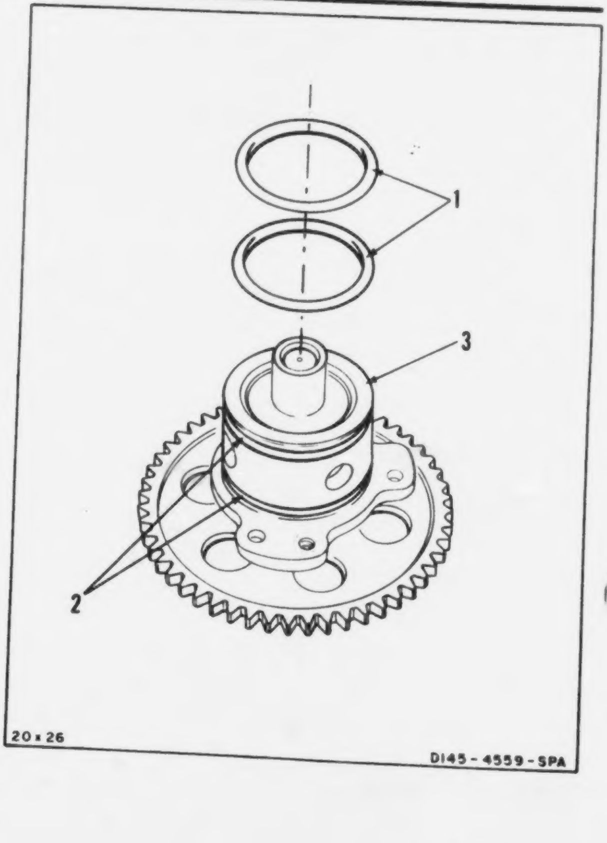
***General Safety Instructions:***

**WARNING**

**Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.**

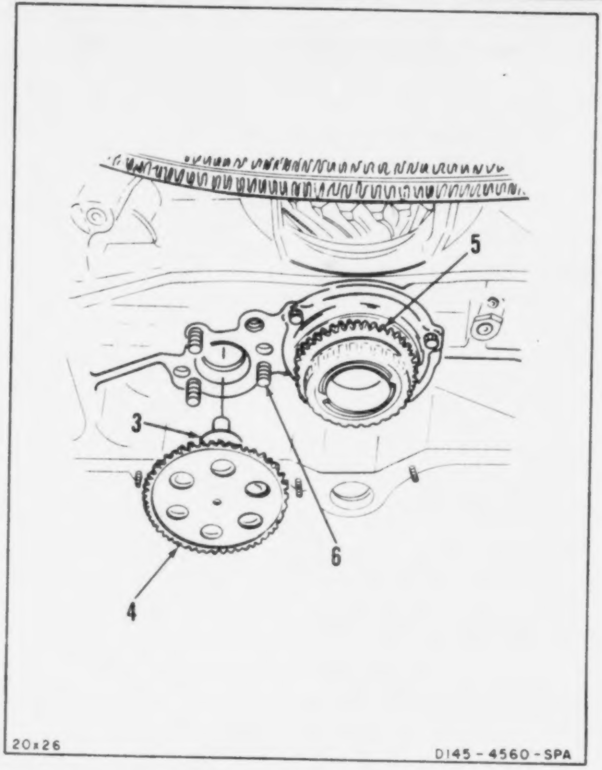

AUXILIARY
OIL PUMP
MOUNTING
SURFACE
20 x 26
D145-4558-SPA

1. Install packings (1) in grooves (2) of pump (3).


1
2
3
20 x 26
D145-4559-SPA

GO TO NEXT PAGE

## 6-128 INSTALL FORWARD TRANSMISSION AUXILIARY OIL PUMP (Continued) 6-128



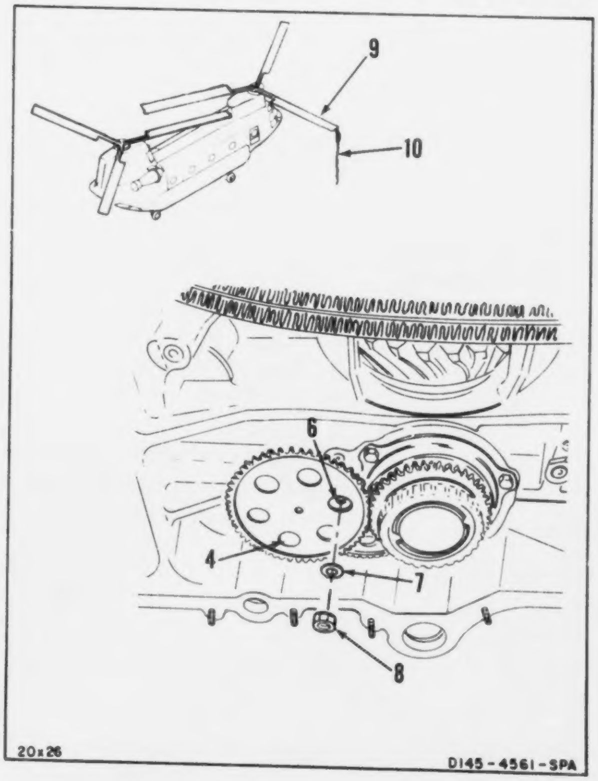
**WARNING**

**Keep fingers away from drive gear if blades are turned. Turning gear can cause injury to personnel.**

**CAUTION**

**If drive gear teeth do not align with drive gear, pump can be damaged.**

2. **Align teeth** of pump drive gear (4) with teeth of transmission drive gear (5). **Install pump (3)** on three studs (6).



**WARNING**

**Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.**

3. **Install three** washers (7) and **nuts (8).** Have helper pull blade (9) around with tie-down line (10) as needed to align access holes in drive gear (4) with studs (6). **Torque nuts to 60 inch-pounds.**

***INSPECT***

FOLLOW-ON MAINTENANCE:

Install forward transmission sump (Task 6-37).

Install forward transmission drip pan (Task 2-3).

Service forward transmission (Task 1-54.)

Remove tiedown line from forward blade (Task 1-26).

Perform operational check (TM 55-1520-240-10).

**END OF TASK**

## 6-129 REPLACE FORWARD TRANSMISSION AUXILIARY OIL FILTER 6-129

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, Two Quart
Torque Wrench, 30 to 150 Inch-Pounds

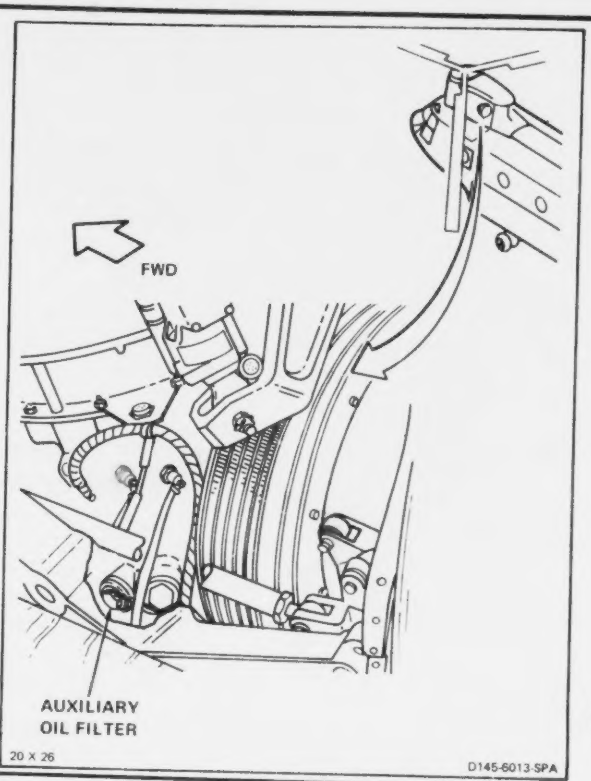
***Materials:***
Lockwire (E231)
Oil (E254)

***Parts:***
Packing
Filter

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Forward Transmission Fairing Open (Task 2-2)



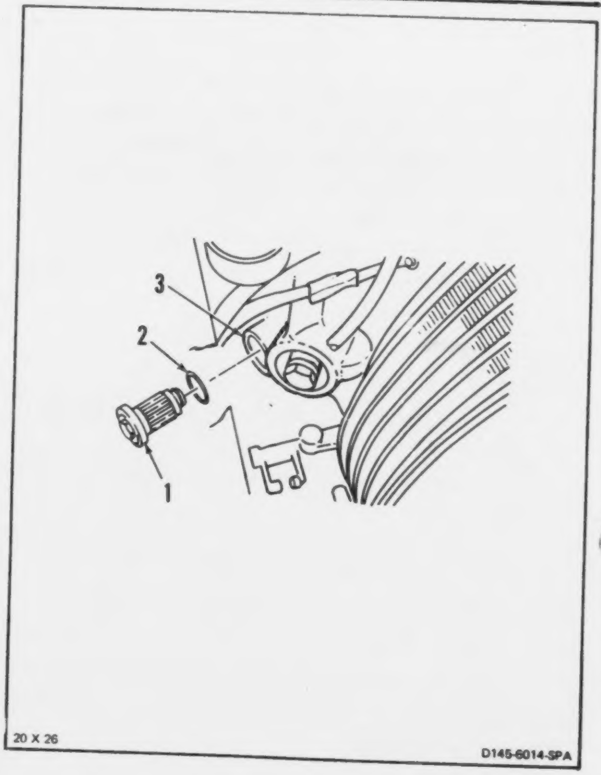
### *REMOVE FILTER*

1. Remove lockwire from filter (1).

**CAUTION**

**Do not let debris enter transmission cavity. Damage can result.**

2. **Remove filter (1)** and packing (2) from transmission (3). Catch spilled oil in container.
3. Check outside of filter (1) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-112).



*GO TO NEXT PAGE*

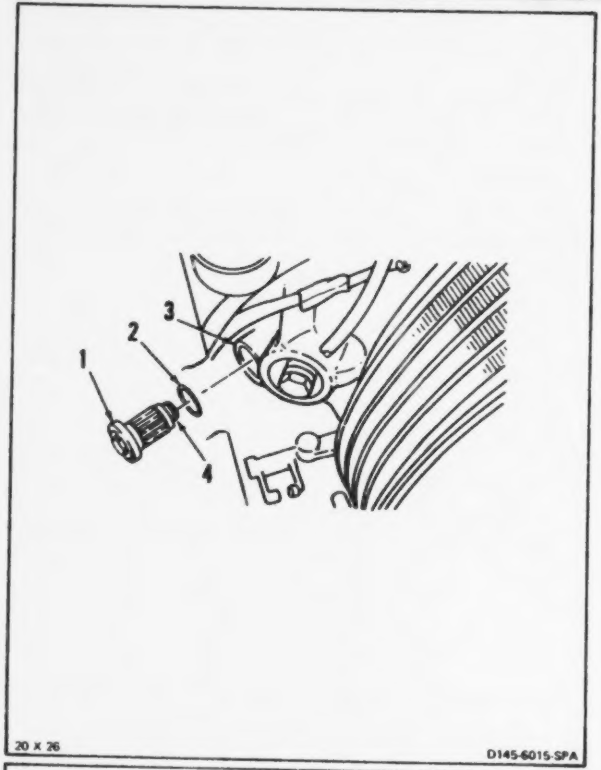
## 6-129 REPLACE FORWARD TRANSMISSION AUXILIARY OIL FILTER (Continued) 6-129

### *INSTALL FILTER*

**NOTE**

Do not reuse removed filter. Filter is supplied with one packing installed.

4. Coat packings (2 and 4) and thread of new filter (1) with oil (E254).
5. **Install filter (1)** and packing (2) in transmission (3). **Torque filter to 80 inch-pounds.**

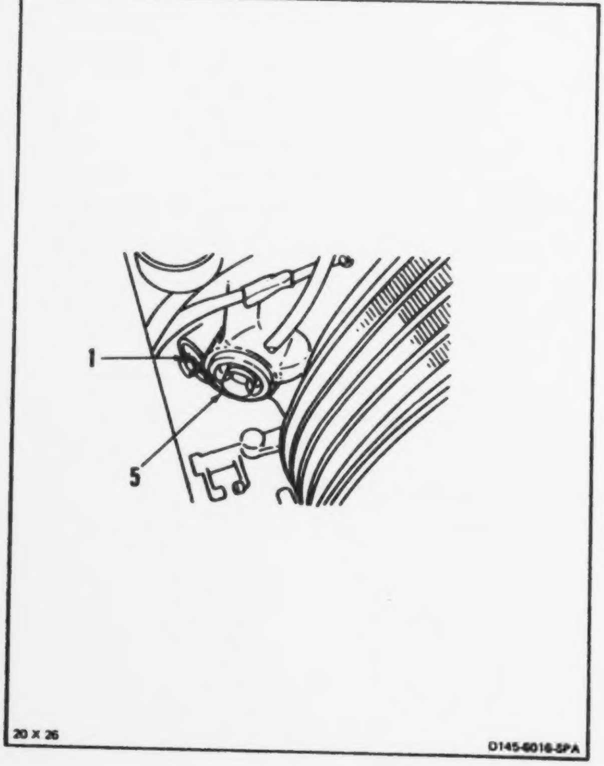


6. **Lockwire filter (1)** to inlet screen (5). Use lockwire (E230).

### *INSPECT*

FOLLOW-ON MAINTENANCE:

Close left forward transmission fairing (Task 2-2).



**END OF TASK**

## 6-130 REMOVE FORWARD TRANSMISSION INLET SCREEN 6-130

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Socket, 1-Inch

Container, 2-Quart

***Materials:***

Barrier Material (E80)

Tape (E388)

Cloths(E120)

***Personnel Required:***

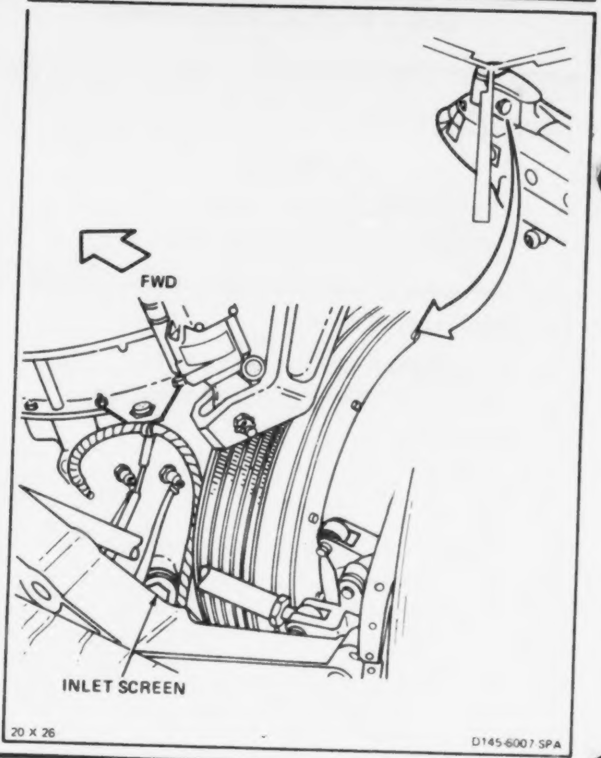
Medium Helicopter Repairer

***Equipment Condition:***

Battery Disconnected (Task 1-39)

Electrical Power Off

Left Forward Transmission Fairing Open (Task 2-2)



1. Remove lockwire from inlet screen (1).

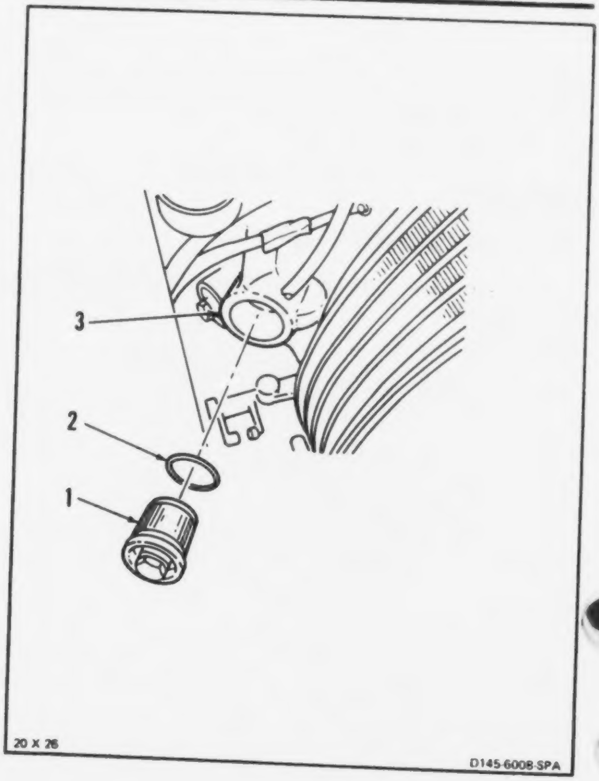
**CAUTION**

**Do not let debris enter transmission. Damage can result.**

2. **Remove screen (1)** and packing (2) from transmission cavity (3). Catch spilled oil in container. Use cloths (E120) for spilled fluid.
3. Check outside of screen (1) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-114).
4. Make sure no debris remains within cavity (3). Cover cavity with barrier material (E80) and tape (E388).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

## 6-131 INSPECT FORWARD TRANSMISSION INLET SCREEN 6-131

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
Brush (E86)

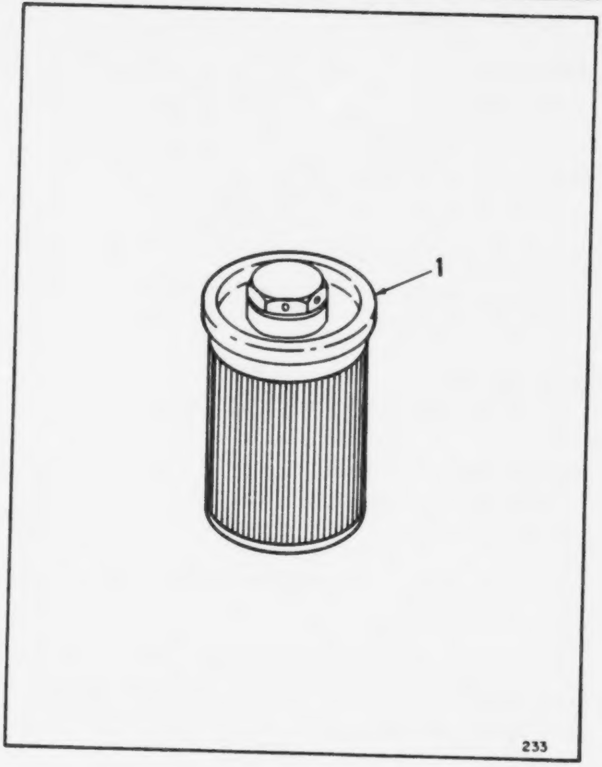
***Personnel Required:***
Medium Helicopter Repairer

***References:***
Task 6-108

***Equipment Condition:***
Off Helicopter Task

---

1. **Check screen (1) for bits of metal and other debris. If debris is found, reject screen. Retain all debris for contamination analysis (Task 6-108).**
2. **Inspect screen (1) for tears.** There shall be no tears.



FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-132 INSTALL FORWARD TRANSMISSION INLET SCREEN 6-132

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Socket, 1-Inch

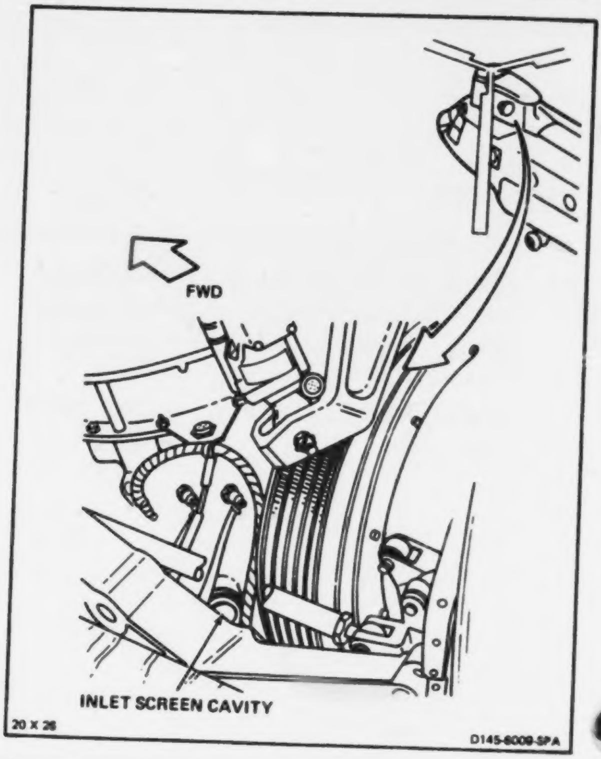
***Materials:***
Oil (E254)
Lockwire (E232)

***Parts:***
Packing

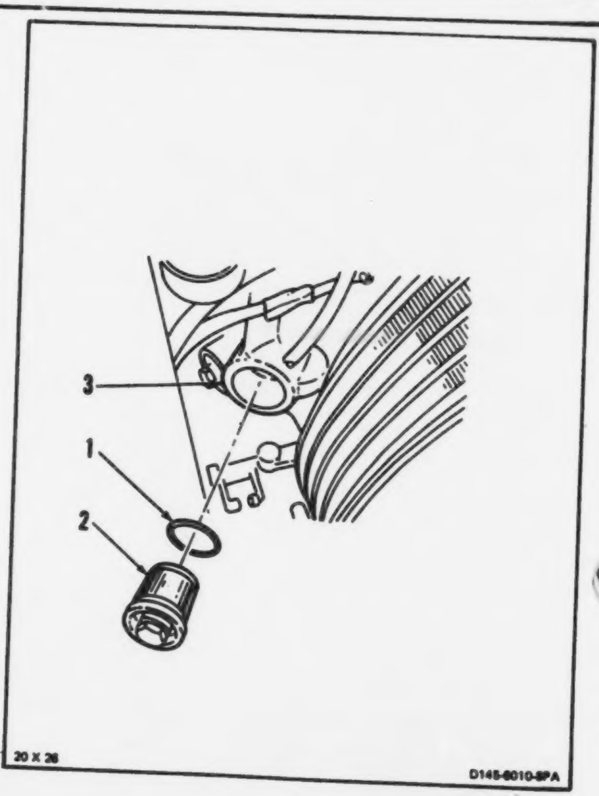
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Inlet Screen Inspected (Task 6-131)


FWD
INLET SCREEN CAVITY
20 X 26
D145-6009-SPA

1. Coat packing (1) and thread of screen (2) with oil (E254).
2. **Install screen (2)** and packing (1) in transmission cavity (3). **Torque screen to 80 inch-pounds.**


3
1
2
20 X 26
D145-6010-SPA

***GO TO NEXT PAGE***

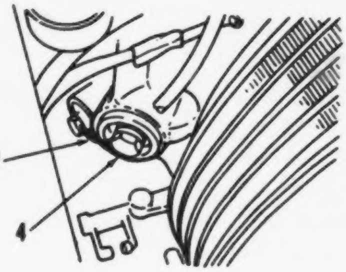
## 6-132 INSTALL FORWARD TRANSMISSION INLET SCREEN (Continued) 6-132

3. Lockwire screen (2) to auxiliary oil filter (4). Use lockwire (E232).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close left forward transmission fairing (Task 2-2).



20 X 28

D145-6011-SPA

**END OF TASK**

# 6-133 REMOVE FORWARD TRANSMISSION DEBRIS DETECTION SCREEN 6-133

INITIAL SETUP

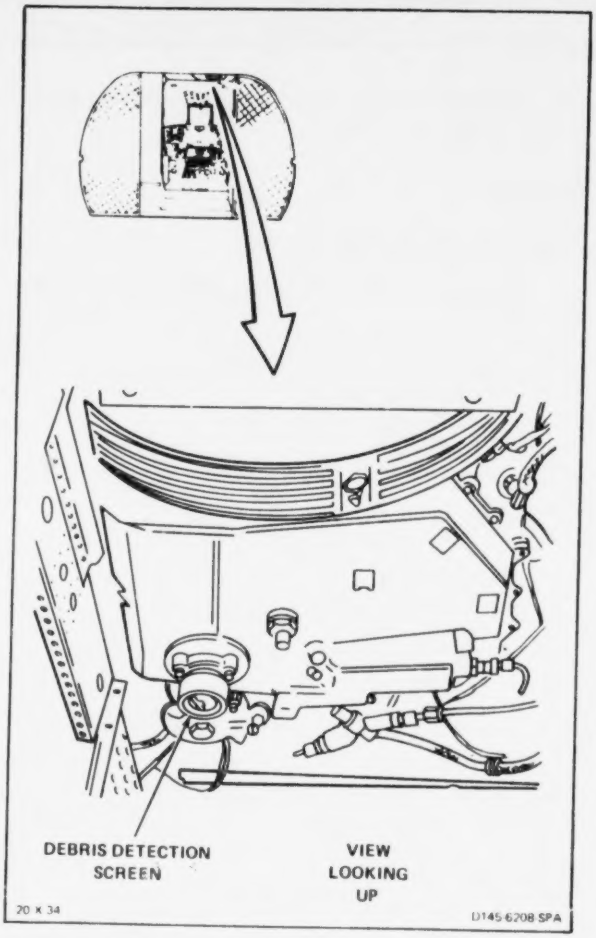
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, 2-Quart (Cap Removal Only)
Container, 14-Quart (Cap and Housing Removal)

***Materials:***
Cloths (E120)

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Forward Transmission
Drip Pan Access Cover Removed (Cap Removal Only) (Task 2-3)
Forward Transmission Drip Pan
Removed (Cap and Housing Removal) (Task 2-3)



---

## REMOVE CAP

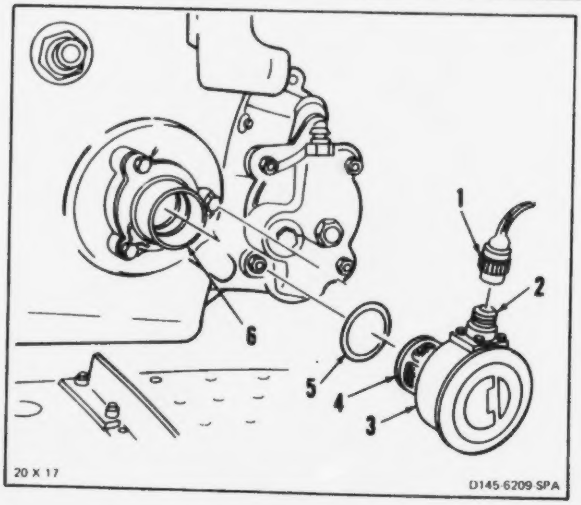
1. **Disconnect connector (1)** from cap receptacle (2).

**NOTE**
Cap holds 2 to 3 ounces of oil.

2. Hold container under can (3). Push in center of cap and **pull down cap** to **remove cap screen (4)** and packing (5). **Drain oil.** Use container to catch oil.

**NOTE**
Screen is part of cap.

3. Filter drained oil through cloth (E120). **Check cloth and screen (4) for debris.** Retain debris for contamination analysis (Task 6-108).
4. If housing (6) will not be removed, omit steps 5. thru 7.



***GO TO NEXT PAGE***

## 6-133 REMOVE FORWARD TRANSMISSION DEBRIS DETECTION SCREEN (Continued) 6-133

*REMOVE HOUSING*

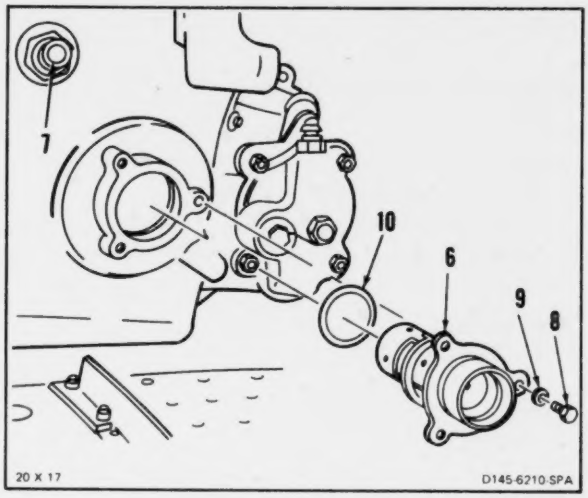
**NOTE**

Sump holds about 28 quarts of oil.

5. **Push in drain valve (7),** twist and pull. **Drain oil.** Use container to catch oil. Push in valve and twist to close.
6. Remove lockwire from three bolts (8). **Remove three bolts** and washers (9).
7. **Remove housing (6)** and packing (10).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-134 INSTALL FORWARD TRANSMISSION DEBRIS DETECTION SCREEN 6-134

INITIAL SETUP

***Applicable Configurations:***
All

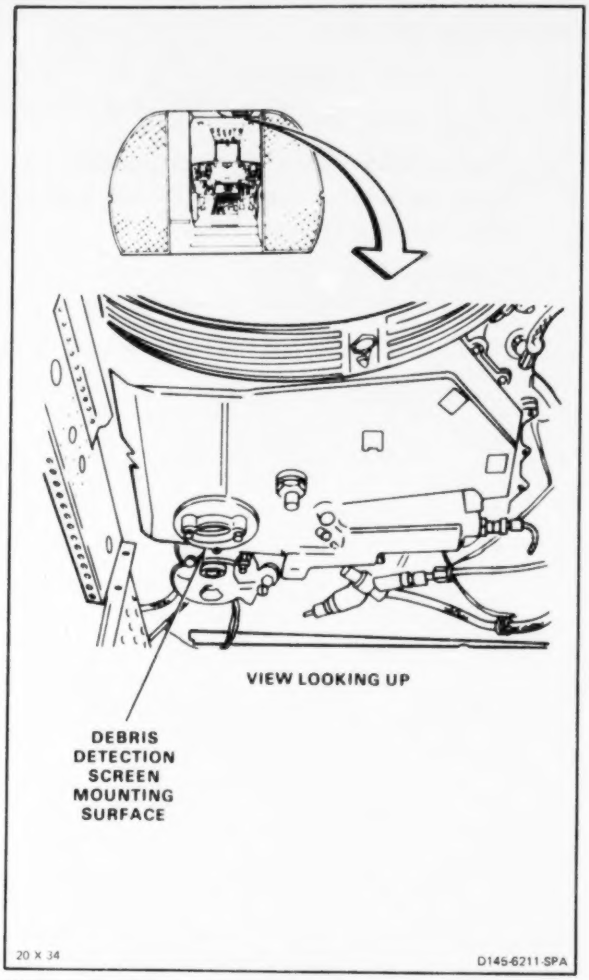
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P
TM 55-1520-240-T

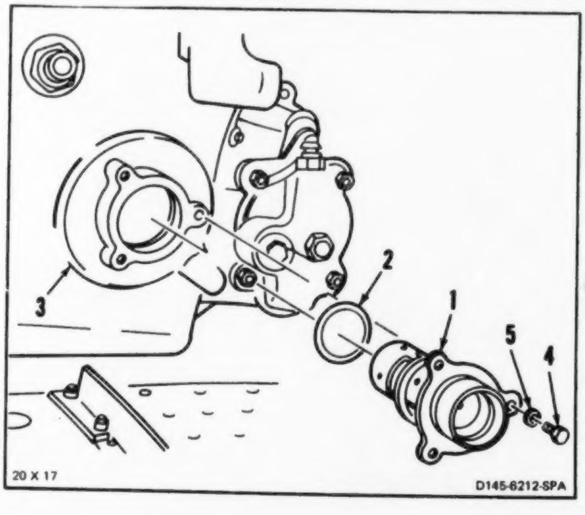

VIEW LOOKING UP
DEBRIS DETECTION SCREEN MOUNTING SURFACE
20 X 34
D145-6211-SPA

**NOTE**

If only cap is being installed, go to step 4.

***INSTALL HOUSING***

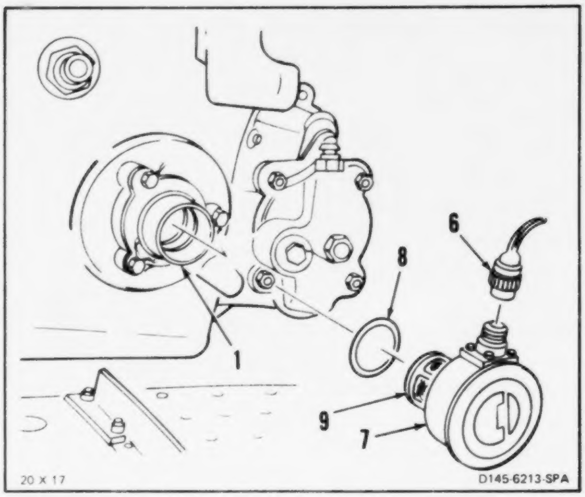
1. **Install housing (1)** and packing (2) in sump (3).
2. **Install three bolts (4)** and washers (5). **Torque bolts to 60 inch-pounds.**
3. Lockwire three bolts (4) together. Use lockwire (E231).


3
2
1
5
4
20 X 17
D145-6212-SPA

***INSPECT***

***GO TO NEXT PAGE***

## 6-134 INSTALL FORWARD TRANSMISSION DEBRIS DETECTION SCREEN (Continued) 6-134

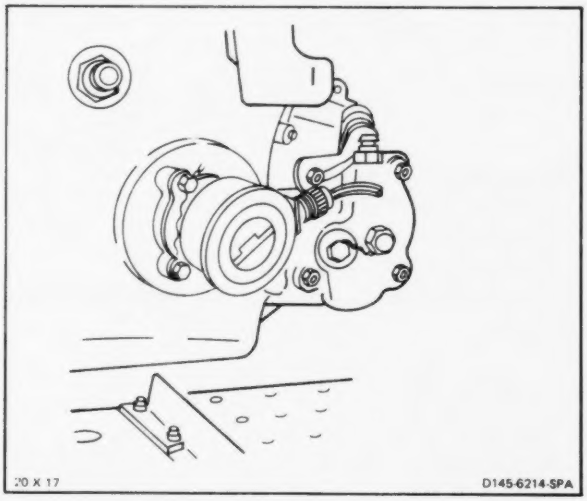


***INSTALL CAP***

**NOTE**

Screen is part of cap.

4. **Connect electrical connector (6)** to cap (7).
5. **Perform operational check** of forward transmission debris detection system (TM 55-1520-240-T).
6. Install packing (8) on screen (9).
7. Press in center of cap (7). Install cap and screen (9) in housing (1).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install forward transmission drip pan access cover (cap only installed) (Task 2-2).

Install forward transmission drip pan (cap and housing installed) (Task 2-3).

Service forward transmission (Task 1-54).

**END OF TASK**

## 6-135 REPLACE FORWARD TRANSMISSION SIGHT GAGE 6-135

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Spanner Wrench
- Container, 14 Quart (3)
- Torque Wrench, 30 to 150 Inch-Pounds

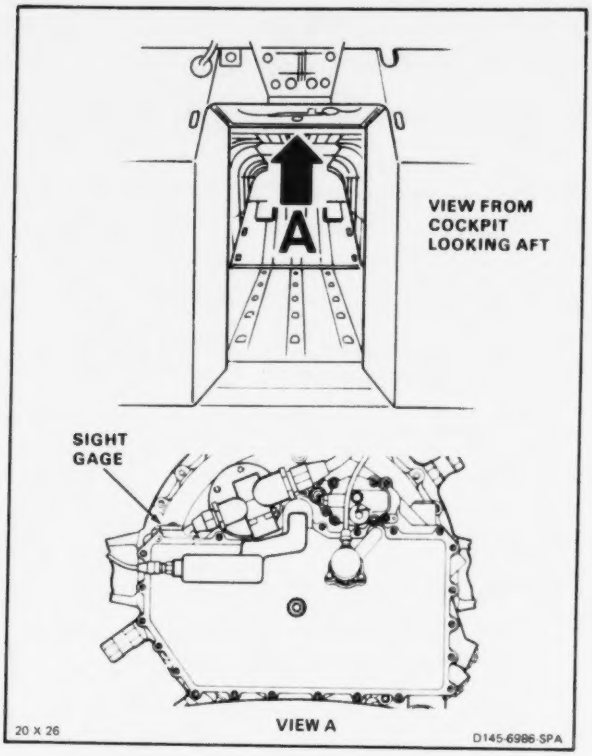
***Materials:***
- Oil (E254)
- Lockwire (E231)

***Parts:***
Packing

***Personnel Required:***
- 67U10 Medium Helicopter Repairer
- 67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Hydraulic Power Off
- Forward Transmission Drip Pan Removed (Task 2-3)

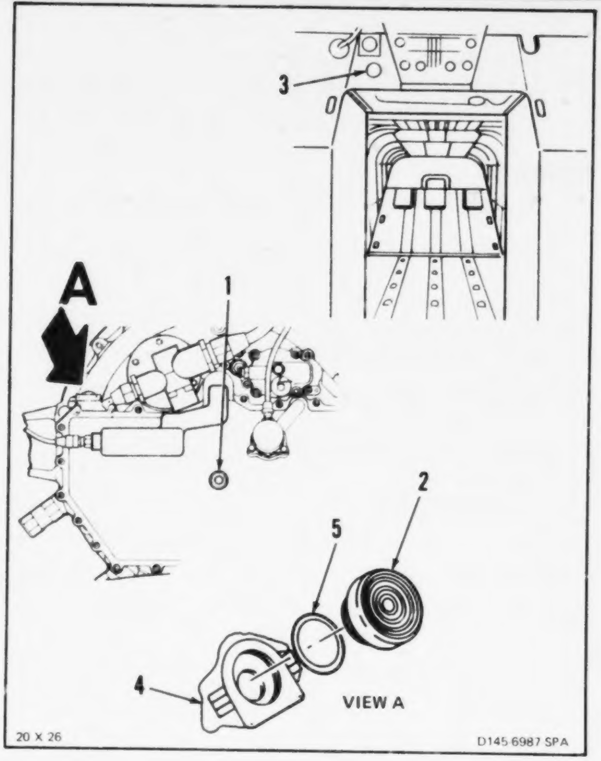

A
VIEW FROM COCKPIT LOOKING AFT
SIGHT GAGE
20 X 26
VIEW A
D145-6986 SPA

***GO TO NEXT PAGE***

## 6-135 REPLACE FORWARD TRANSMISSION SIGHT GAGE (Continued) 6-135

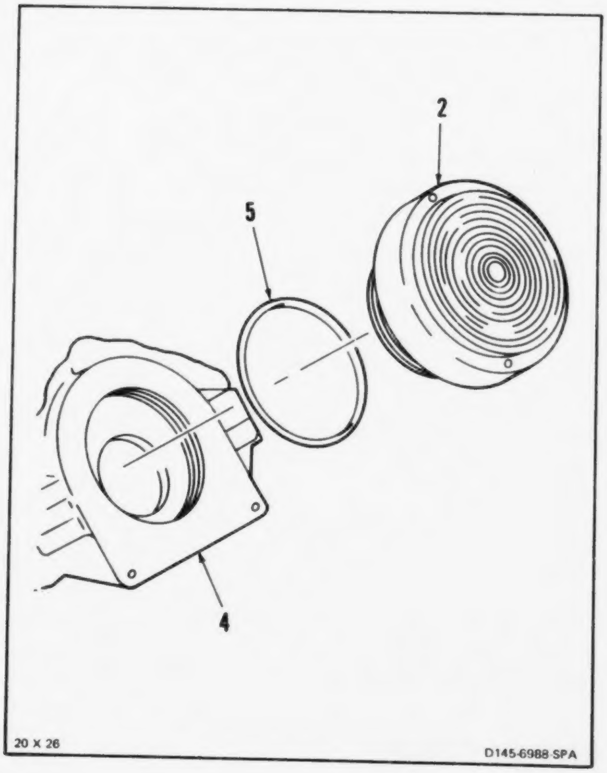
### *REMOVE SIGHT GAGE*

1. Position containers under sump drain valve (1).
2. Push in drain valve (1), twist, and pull. **Drain oil** into container **until oil level is below sight gage (2).** View oil level from cockpit through access hole (3).
3. Close drain valve (1) by pushing it in and twisting it.
4. Remove lockwire from sight gage (2). **Remove gage** from transmission (4). Use spanner wrench.
5. Remove packing (5) from sight gage (2).



### *INSTALL SIGHT GAGE*

6. Coat packing (5) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. **Install sight gage (2)** in transmission (4). Use spanner wrench. **Torque gage to 80 inch-pounds.**



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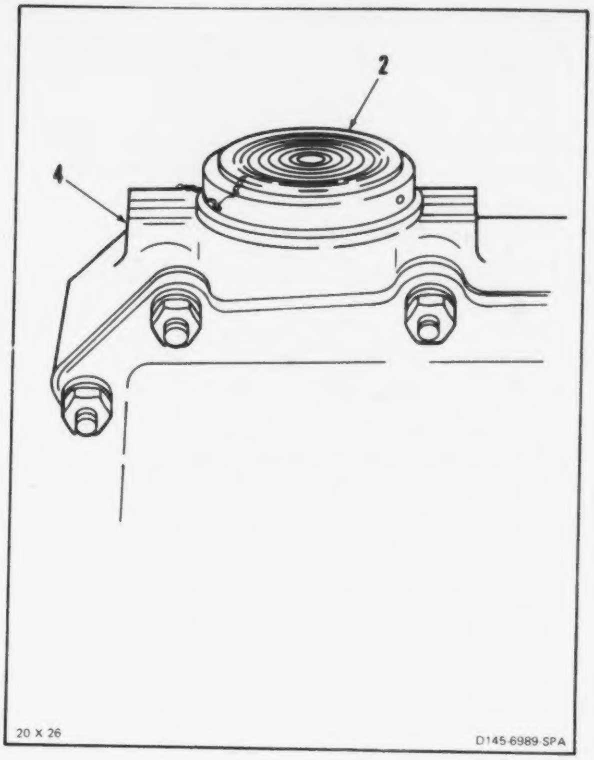
## 6-135 REPLACE FORWARD TRANSMISSION SIGHT GAGE (Continued) 6-135

8. Lockwire sight gage (2) to transmission (4). Use lockwire (E231).

***INSPECT***



FOLLOW-ON MAINTENANCE:

Service forward transmission (Task 1-54).

Install forward transmission drip pan (Task 2-3).

**END OF TASK**

## 6-136 CONTAMINATION ANALYSIS OF AFT TRANSMISSION OIL 6-136

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Magnet
Magnifying Glass, 12-Power

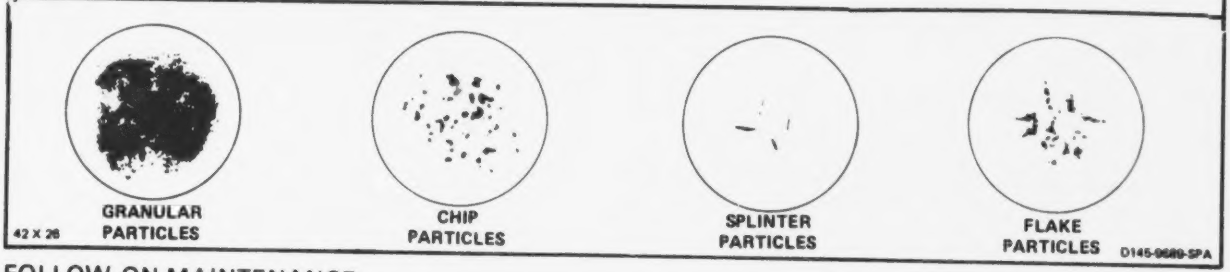
***Materials:***
None

***Personnel Required:***
67U30 Inspector

***Equipment Condition:***
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
   a. Separate steel particles. Use a magnet.
   b. Identify and separate remaining particles by visual inspection.
   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

| MATERIAL | DESCRIPTION | ACTION REQUIRED |
|---|---|---|
| Steel | Fine, hair-like fuzz particles | Normal wear. No action required |
| | Limited amount of splinters, flakes, or or granular particles | Possible failure. Perform serviceability check (Task 6-140) |
| | Thin flakes up to 1/16-inch in diameter and 1/4-inch long, maximum of 10 flakes | Perform serviceability check (Task 6-140) |
| | Massive amount of splinters, flakes, or granular particles | Failure. Replace transmission (Task 6-92 and 6-97) or aft rotor shaft (Task 6-56 and 6-62) |
| Aluminum or magnesium | Granular particles | Perform serviceability check (Task 6-140) |
| Copper, bronze, or silver | Limited amount of granular particles | Possible indication of bearing cage wear. Perform serviceability check (Task 6-140) |
| | Massive amount of granular particles or chip particles | Failure. Replace transmission (Task 6-92 and 6-97) or aft rotor shaft (6-56 and 6-62) |
| Fiberglass | Granular or fibrous particles | Perform serviceability check (Task 6-140) |



FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-137 AFT TRANSMISSION OIL SYSTEM ALLOWABLE LEAKAGE 6-137

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Flashlight
Workstand

***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter On Level Surface
Right Baffle Under Aft Transmission Open (Task 2-2)

**WARNING**

**Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.**

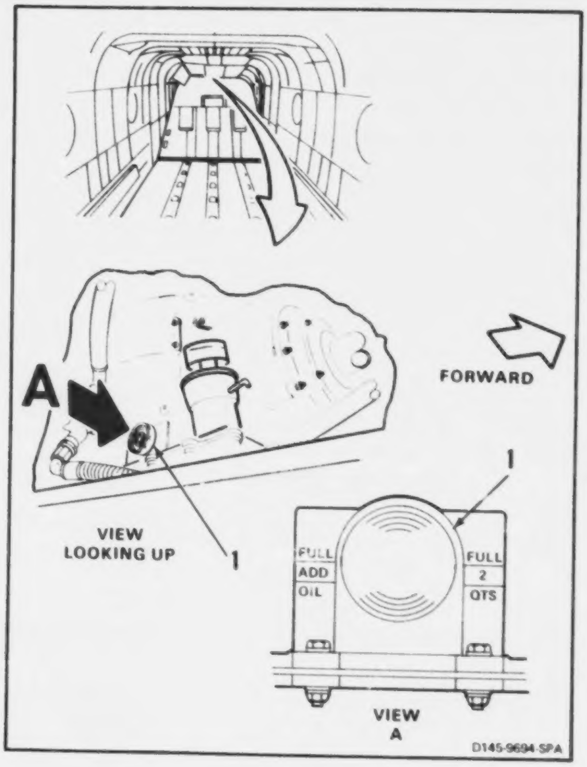
**CAUTION**

**The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is 20 drops (one cubic centimeter) per hour. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.**

**NOTE**

If engines have not been operated for 30 minutes or more, perform a 5-minute ground run (TM 55-1520-240-10).

1. **Check sight gage (1)** to determine oil level. **Oil level shall be between the FULL and ADD OIL lines after a 2 hour flight.**



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Close baffle under aft transmission (Task 2-2).

**END OF TASK**

## 6-138 DRAIN AFT TRANSMISSION OIL

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Container, 14-Quart (3)
Hose, 1-Inch ID, 36 Inches Long

***Materials:***

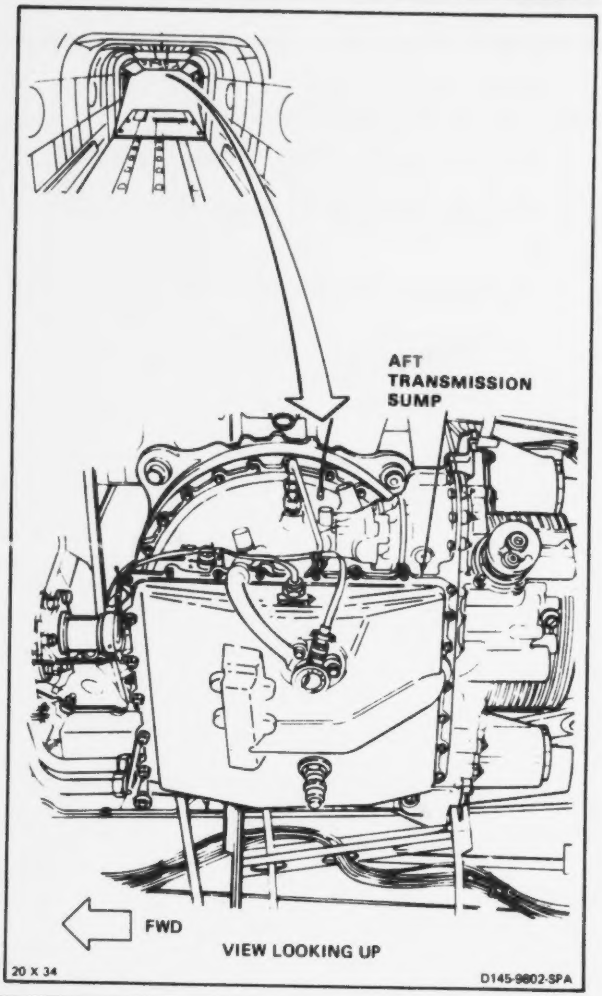
None

***Personnel Required:***

Medium Helicopter Repairer

***Equipment Condition:***

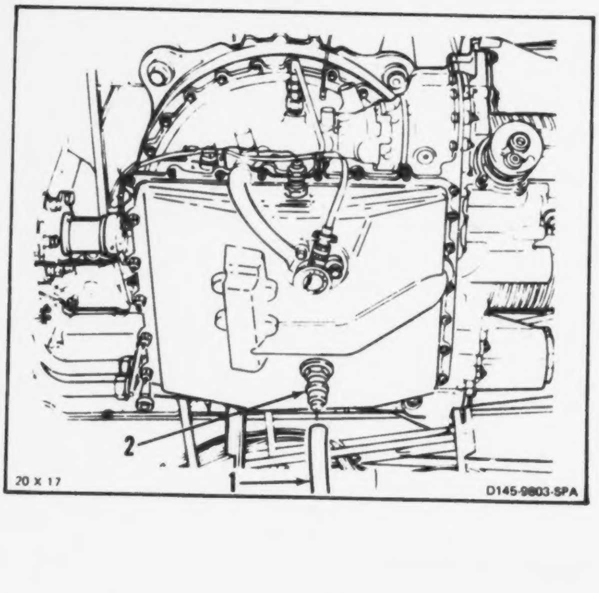
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)


AFT
TRANSMISSION
SUMP
FWD
VIEW LOOKING UP
20 X 34
D145-9802-SPA

**NOTE**

Sump holds about 30 quarts of oil.

1. **Connect hose (1)** to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
3. Push in drain valve (2), twist it, and pull down. Remove hose (1) from valve.


2
1
20 X 17
D145-9803-SPA

*GO TO NEXT PAGE*

## 6-138 DRAIN AFT TRANSMISSION OIL (Continued) 6-138

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-139 FLUSH AFT TRANSMISSION OIL SYSTEM 6-139

INITIAL SETUP

***Applicable Configurations:***
All

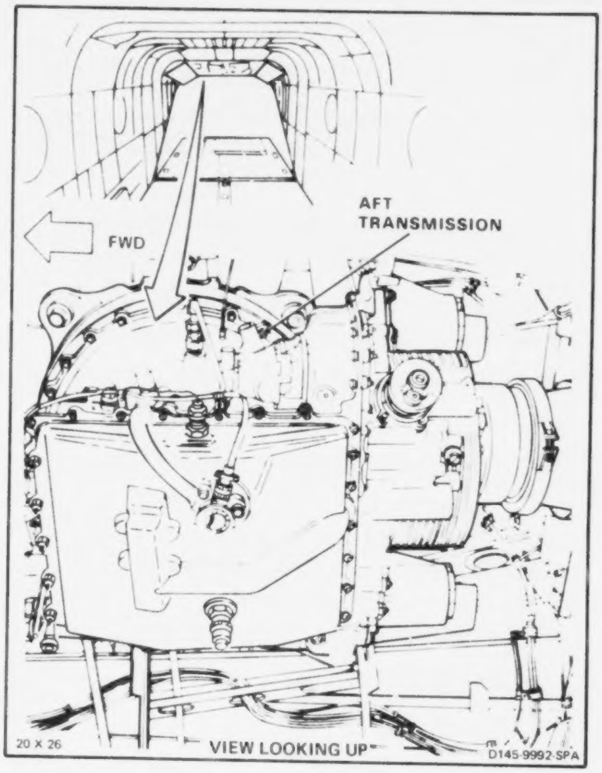
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

***References:***
Task 1-54
Task 6-138
Task 6-148
Task 6-154
Task 6-155
Task 6-156
Task 6-157
Task 6-158
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



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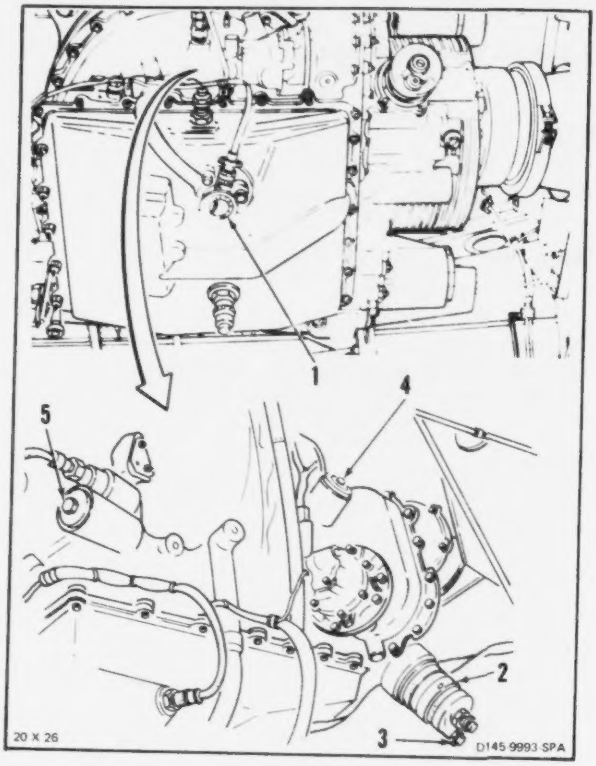
## 6-139 FLUSH AFT TRANSMISSION OIL SYSTEM (Continued) 6-139



1. **Drain oil** from aft transmission (Task 6-138).
2. Remove and **clean debris detection screen** cap (1) (Task 6-157). Install cap (Task 6-158).
3. **Replace main oil filter element (2)** (Task 6-148). Note position of indicator button (3).
4. If indicator button (3) was extended, **replace inlet screens (4)** (Task 6-155 and 6-156).
5. **Replace auxiliary oil filter (5)** (Task 6-154).
6. **Service aft transmission** with oil (Task 1-54).
7. Have pilot **perform ground run** (TM 55-1520-240-10). When aft transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. **Repeat steps 1 thru 6.**

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3)

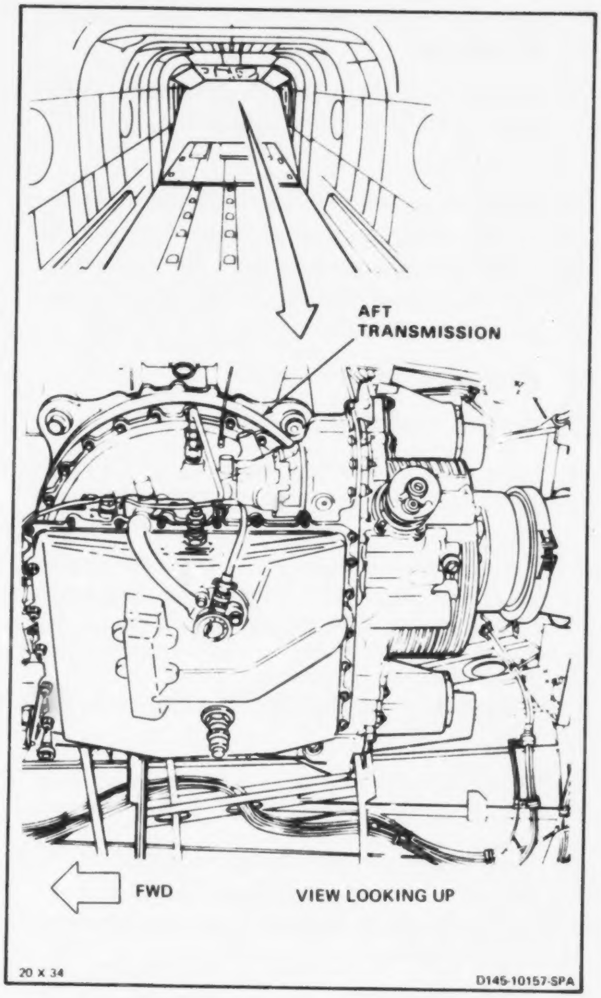
Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-140 AFT TRANSMISSION SERVICEABILITY CHECK 6-140

INITIAL SETUP



***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Cheesecloth (E112)

***Personnel Required:***
67U20 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

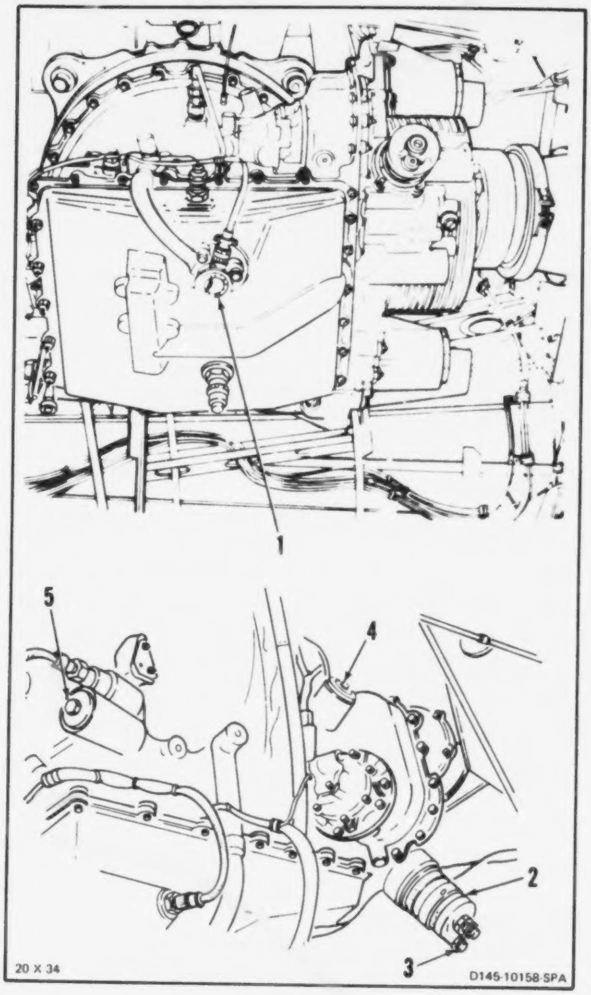
***References:***
Task 1-54
Task 6-131
Task 6-138
Task 6-148
Task 6-154
Task 6-155
Task 6-156
Task 6-157
Task 6-158
Task 6-92
Task 6-97
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)

***GO TO NEXT PAGE***

## 6-140 AFT TRANSMISSION SERVICEABILITY CHECK (Continued) 6-140

1. **Drain oil through cheesecloth (E112)** or similar filter material (Task 6-138). **Check for debris.**
2. Remove and **clean debris detection screen cap (1)** (Task 6-157). **Install cap** (Task 6-158).
3. **Replace element in main oil filter (2)** (Task 6-148). Note position of indicator button (3). **If button is extended,** remove and inspect inlet screen (4) (Task 6-157 and 6-131). Install screen (6-156).
4. **Replace auxiliary oil filter (5).**
5. **Service transmission** (Task 1-54).
6. Have pilot **perform ground run for 1 hour** at normal rotor rpm (TM 55-1520-240-10). If forward transmission oil pressure or temperature changes abnormally or if debris screen or chip detector light comes on, have pilot shut down helicopter. Check for cause.
7. **Drain oil** through cheesecloth (E112) or similar filter material (6-138). **Check for debris.**
8. Remove, inspect, and **clean debris screen cap (1)** (Task 6-157). **Install cap** (6-158).
9. **Remove element in main oil filter (2). If** element contains **debris or** filter **button (3)** was **extended, replace** with new **element** (Task 6-148).
10. **If** element in filter (2) contains **debris and** filter **button (3)** was **also extended,** remove, **inspect,** and install **inlet screen (4)** (Task 6-155, 6-131, and 6-156).
11. **Replace auxiliary oil filter (5)** (Task 6-154).
12. **If** quantity and size of **particles** obtained from oil filters (2 and 5) and cap (1) **have not decreased by at least 30 percent** from original amount, **replace aft transmission (Task 6-92 and 6-97).**



13. **If** quantity and size of **particles** obtained from oil filters (2 and 5) and cap (1) **have decreased by 30 percent or more, repeat steps 1 thru 11.** If any debris is obtained replace aft transmission (Task 6-92 and 6-97).

FOLLOW-ON MAINTENANCE:

Close cargo ramp (TM 55-1520-240-T).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

**END OF TASK**

## 6-141 REMOVE AFT TRANSMISSION OIL COOLER FAN 6-141

INITIAL SETUP

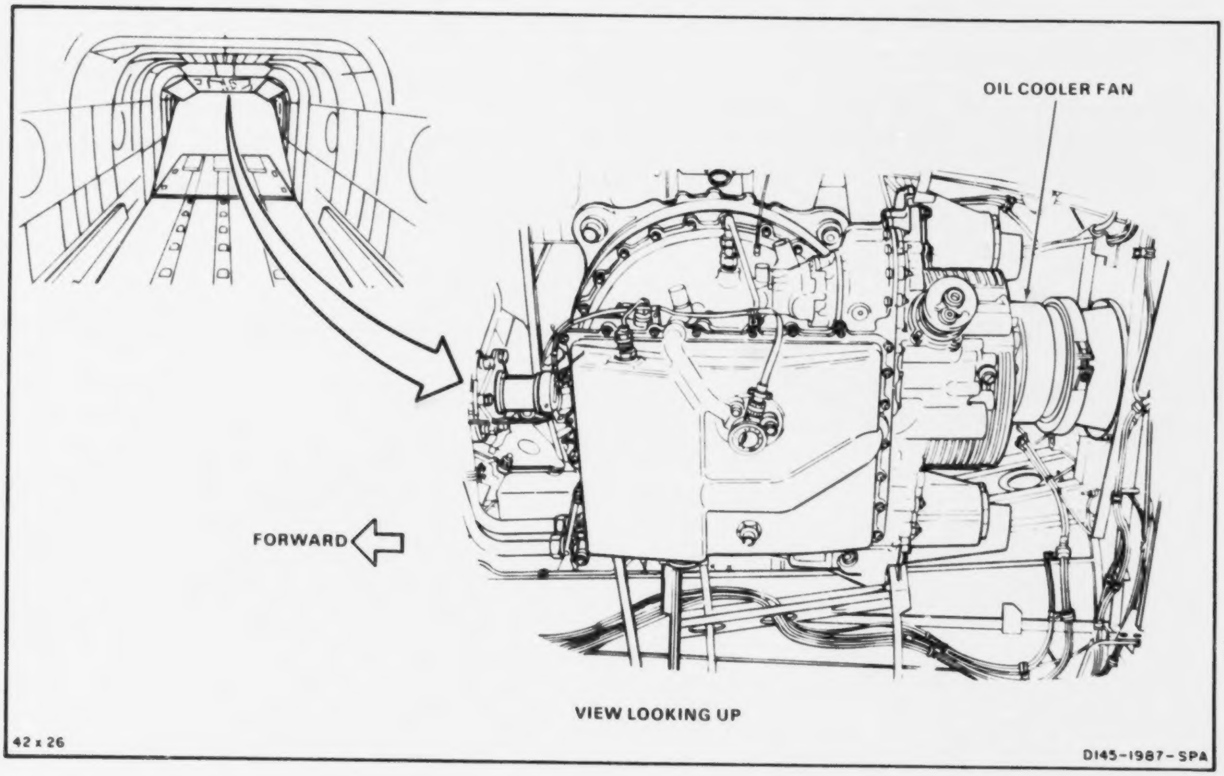
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

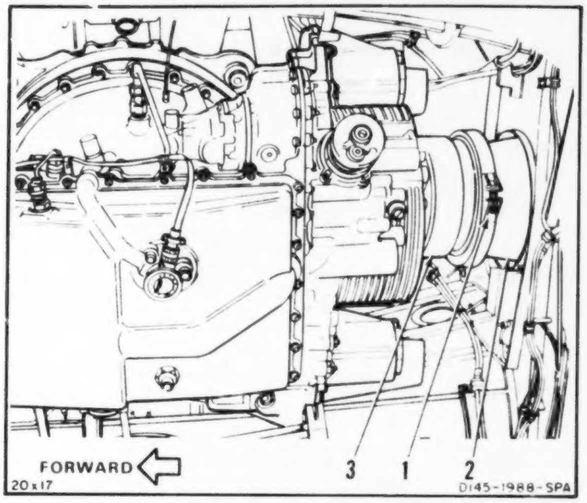
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)


OIL COOLER FAN
FORWARD
VIEW LOOKING UP
42 x 26
D145-1987-SPA

***GO TO NEXT PAGE***

## 6-141 REMOVE AFT TRANSMISSION OIL COOLER FAN (Continued) 6-141

1. **Loosen clamp (1)** securing duct (2) to fan (3). **Slide duct and clamp aft,** off fan.

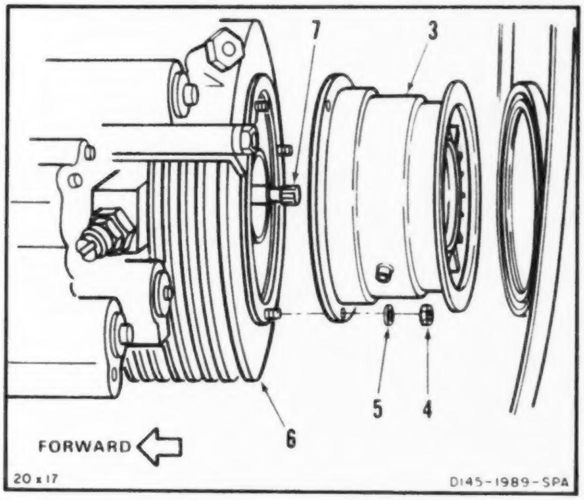

FORWARD
20 x 17
3
1
2
D145-1988-SPA

2. **Remove four nuts (4) and washers (5)** from fan (3). Pull fan (3) away from cooler (6) until shaft (7) can be seen.

**NOTE**

Fan cannot be removed if shaft comes out with fan.

3. **Remove fan (3)** from shaft (7). **Make sure shaft does not come out** with fan. If needed, push shaft back into cooler (6).

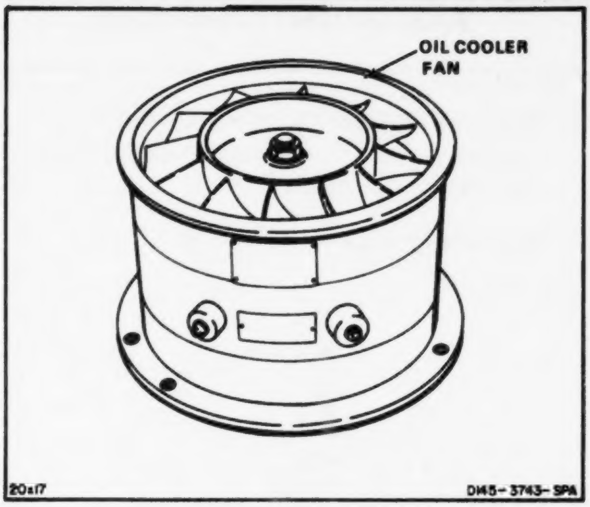

7
3
5
4
6
FORWARD
20 x 17
D145-1989-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-142 DISASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) 6-142



INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Type Heater
Pyrometer
Kevlar Gloves (E187)
Arbor Press
Wood Dowel, 3/4-Inch x 12 Inches
Spanner Wrench
Drift, Brass or Aluminum

***Materials:***
None

***Personnel Required:***
Aircraft Powertrain Repairer

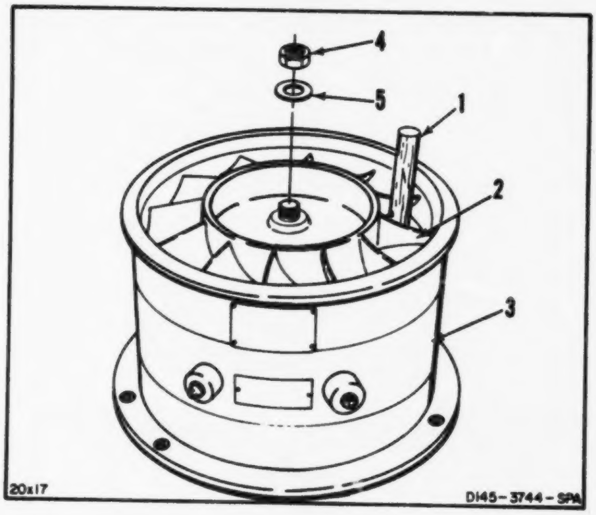
***Equipment Condition:***
Off Helicopter Task

---

**NOTE**

Wood dowel keeps impeller from turning when removing nut.

1. Insert wood dowel (1) between vanes of impeller (2) and housing (3).
2. **Remove nut (4)** and washer (5).
3. Remove dowel (1).



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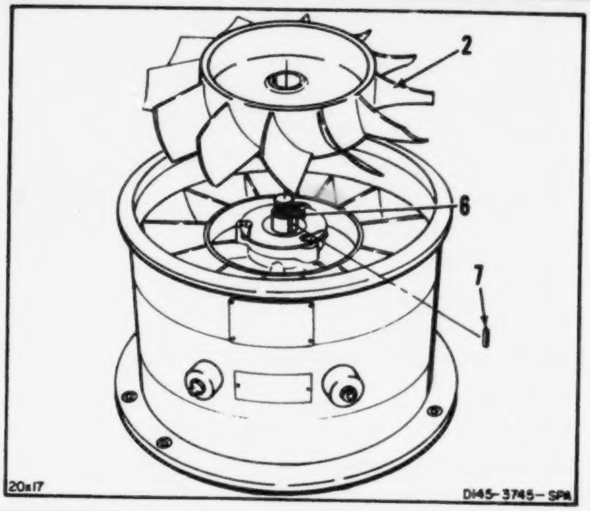
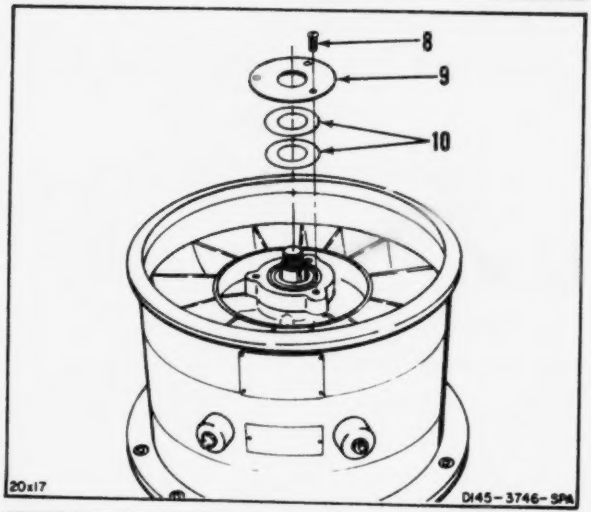
## 6-142 DISASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-142

4. **Remove impeller (2)** from shaft (6). If needed, pull on impeller while tapping shaft with soft-faced mallet.
5. **Remove key (7)** from shaft (6).


2
6
7
20x17
D145-3745-SPA

6. **Remove** lockwire, three screws (8), and **retainer (9).**
7. Remove two spring washers (10).

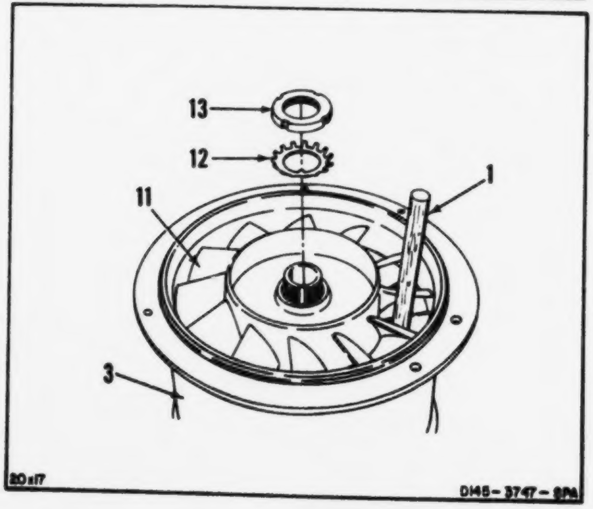

8
9
10
20x17
D145-3746-SPA

8. Turn housing (3) over 180 degrees.

**NOTE**

Wood dowel keeps impeller from turning when removing nut.

9. Insert wood dowel (1) between vanes of impeller (11) and housing (3).
10. Bend tangs of tangwasher (12) clear of nut (13).
11. **Remove nut (13).** Use spanner wrench. Remove tangwasher (12).
12. Remove dowel (1).


13
12
11
1
3
20x17
D145-3747-SPA

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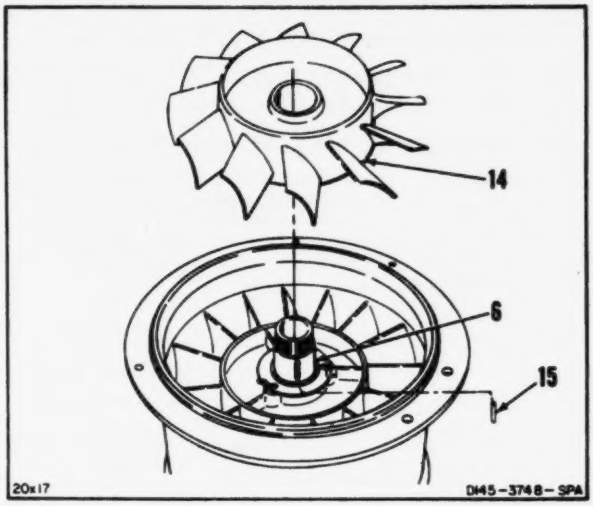
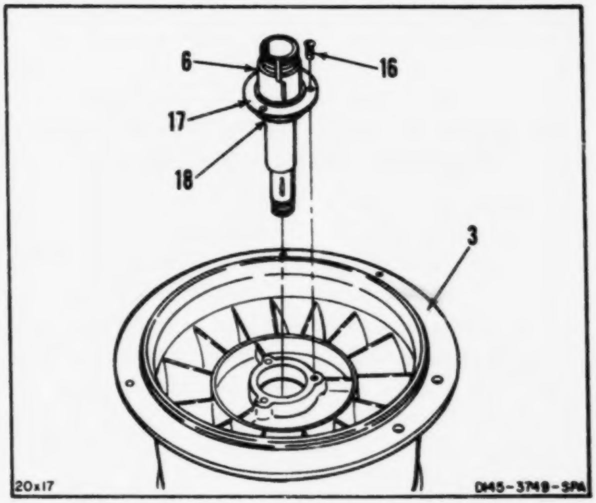
## 6-142 DISASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-142

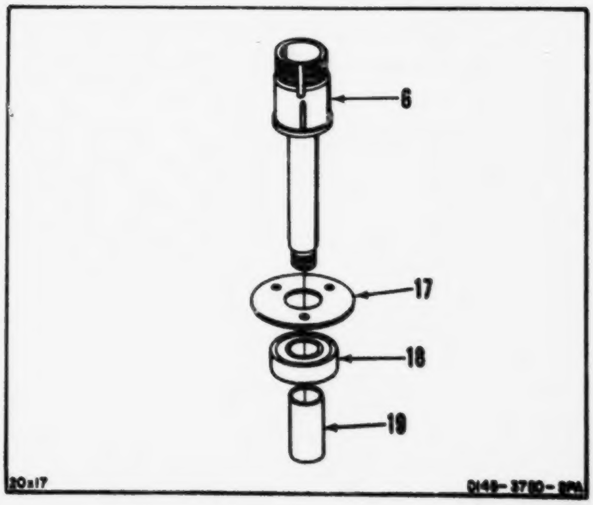
13. **Remove impeller (14)** from shaft (6). If needed, pull on impeller while tapping shaft with soft-faced mallet.
14. **Remove key (15)** from shaft (6).


14
6
15
20x17
DH5-3748-SPA

15. **Remove** lockwire and **three screws (16).**
16. **Remove shaft (6),** with retainer (17) and bearing (18), from housing (3). Use arbor press.


6
16
17
18
3
20x17
DH5-3749-SPA

17. **Remove bearing (18) and spacer (19)** from shaft (6). Use arbor press.
18. **Remove retainer (17)** from shaft (6).


6
17
18
19
20x17
DH5-3750-SPA

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## 6-142 DISASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-142

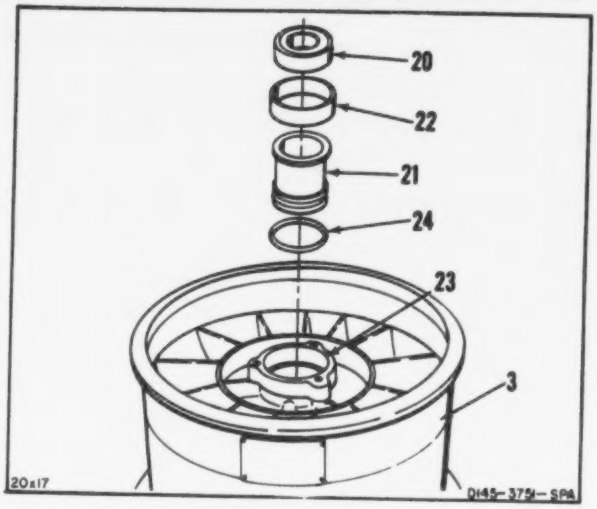
19. Turn housing (3) over 180 degrees.
20. **Remove bearing (20)** from housing (3). Use brass or aluminum drift, if needed.
21. **Remove grease sleeve (21) and bearing liner (22).** If needed, use heat and arbor press as follows:

**WARNING**

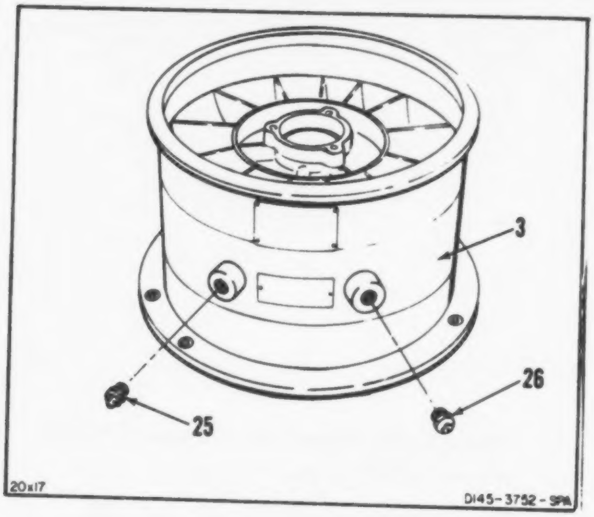
**Wear Kevlar gloves when handling heated parts.**

    a. Heat area around bore (23) to 230 to 250°F (110 to 120°C). Use heat gun. Measure temperature with pyrometer.
    b. Remove sleeve (21) and liner (22). Use arbor press, if needed.

22. Remove packing (24) from sleeve (21).



23. **Remove grease fitting (25) and vent fitting (26) from housing (3).**



FOLLOW-ON MAINTENANCE:

None

END OF TASK

## 6-142.1 REPAIR AFT TRANSMISSION OIL COOLER FAN 6-142.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Depth Gage 643J
Goggles

***Materials:***
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Epoxy Topcoat (E166)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer
68D30 Inspector

***References:***
TM 43-0103
MIL-M-3171, Type VI
MIL-C-22751

***Equipment Condition:***
Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

*GO TO NEXT PAGE*

## 6-142.1 REPAIR AFT TRANSMISSION OIL COOLER FAN (Continued) 6-142.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** location and extent of **damage** on fan parts.

   **NOTE**

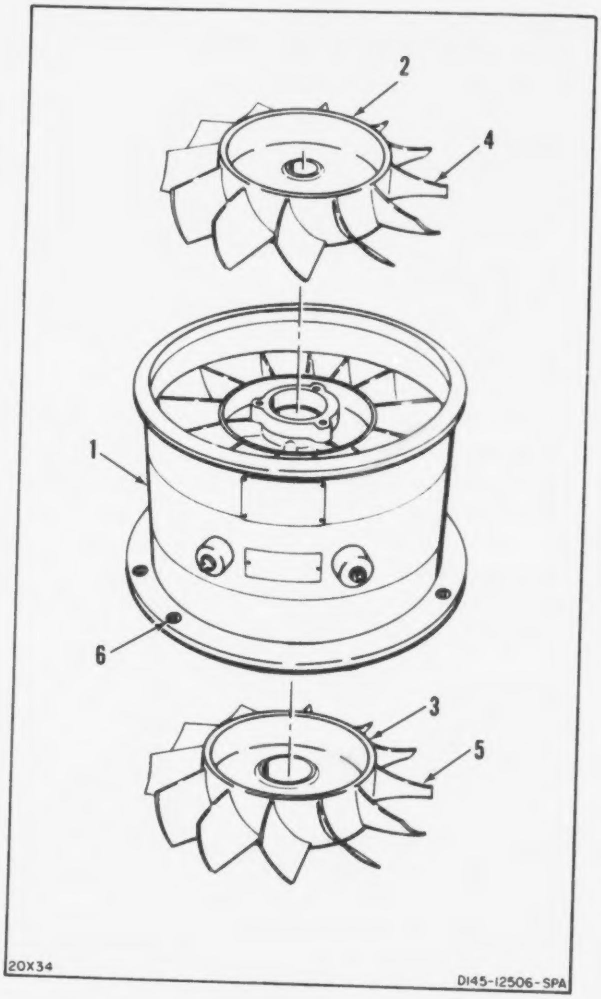
   Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage on housing (1) shall not be more than 0.025 inch.**

   b. **Depth of damage on impellers (2 and 3) shall not be more than 0.015 inch. There shall be no more than four damaged areas on one impeller blade (4 or 5).**

   c. **Damage shall not extend over more than one surface or enter any radius.**

   d. **Damage shall not be closer than 1.00 inch to any mounting hole (4).**
3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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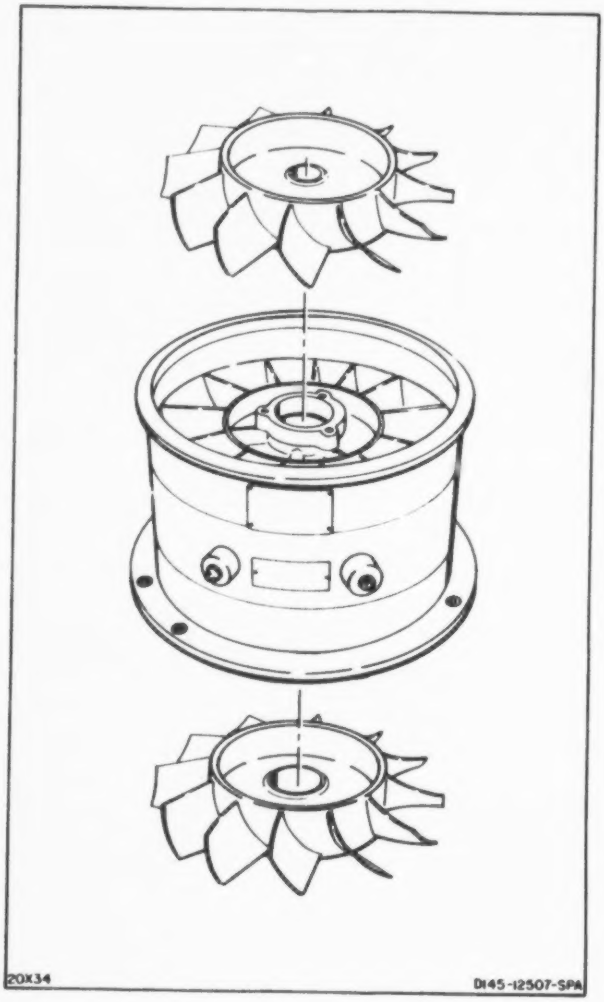
## 6-142.1 REPAIR AFT TRANSMISSION OIL COOLER FAN (Continued)

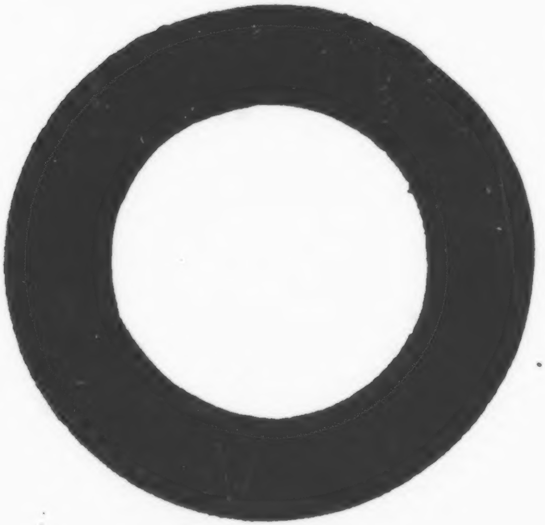
6. Acid-etch reworked area as follows:
   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**
   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**
   c. **Rinse area with cold water.**
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean** reworked area **with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. **Swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-L-3171, Type VI). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse area with cold water and let air dry.**
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.
11. **Apply epoxy** topcoat (E166) (MIL-C-22751).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**



## 6-143 ASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) 6-143

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Goggles
Gun Type Heater
Pyrometer
Kevlar Gloves (E187)
Arbor Press
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Wood Dowel, 3/4-Inch x 12 Inches
Spanner Wrench
Drift, Brass or Aluminum
Hand Luricating Gun

***Materials:***

Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Grease (E190)
Lockwire (E227)
Zinc Chromate Primer (E291)
Teflon Tape (E399)

***Parts:***

Packing
Washers

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

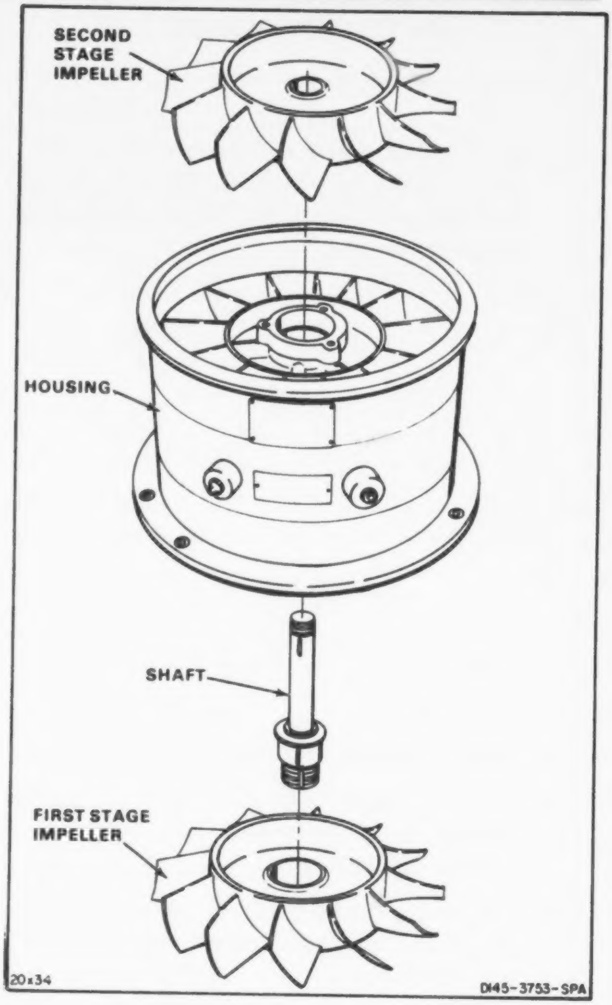
***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

**WARNING**

**Zinc chromate primer (E291) and dry cleaning solvent (E162) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



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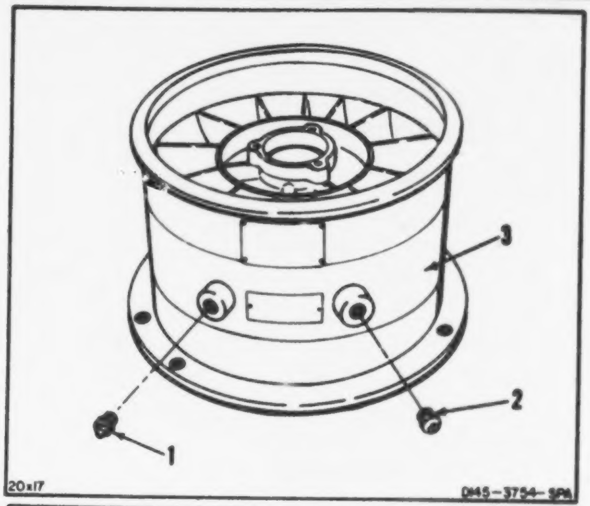
## 6-143 ASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-143

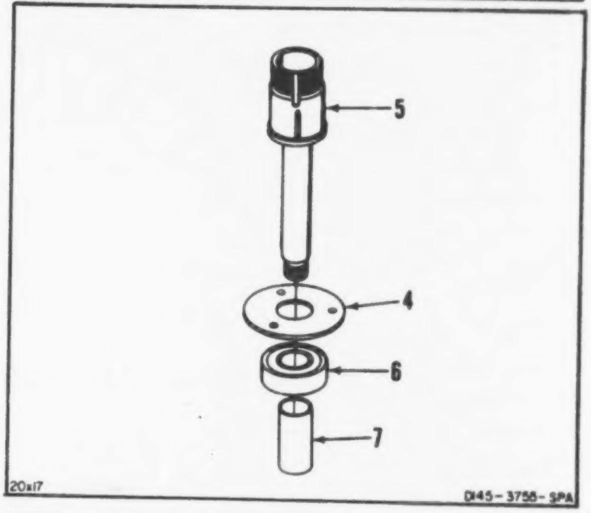
1. Wrap teflon tape (E399) around thread of grease fitting (1) and vent fitting (2). **Install fittings in housing (3). Torque fittings to 55 inch-pounds.**



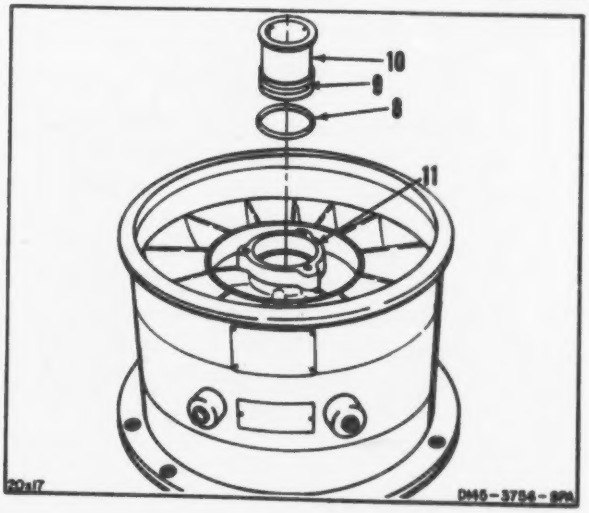
**NOTE**

Bearing retainer is smaller than liner retainer.

2. **Install bearing retainer (4)** on shaft (5).
3. Pack bearing (6) with grease (E190). **Install bearing** on shaft (5), seal end against retainer (4). Use arbor press.
4. Apply heavy coat of grease (E190) to outside of spacer (7). **Install spacer** on shaft (5) against bearing (6).



5. Coat packing (8) with grease (E190). **Install packing** in groove (9) of grease sleeve (10).
6. Coat inside of bore (11) with grease (E190). **Install sleeve (10)** in bore. Use soft-faced mallet.



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## 6-143 ASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-143

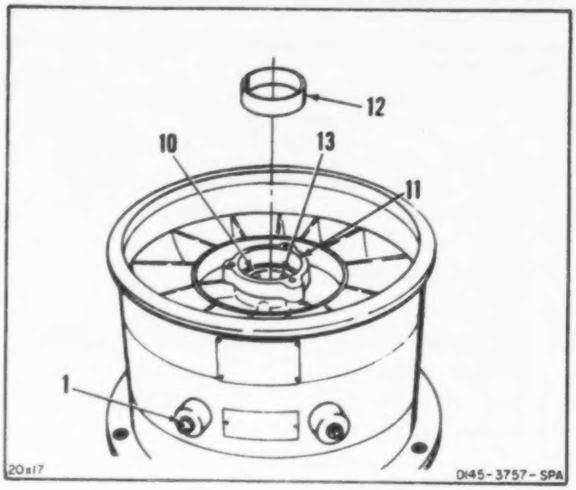
7. **Install bearing liner (12)** in bore (11) as follows:

**WARNING**

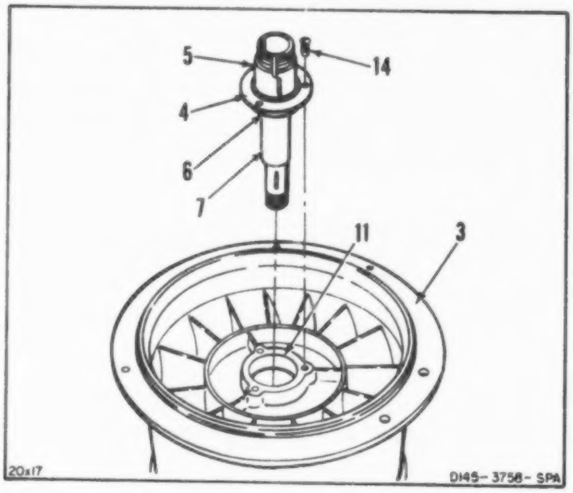
**Wear Kevlar gloves when handling heated parts.**

   a. Heat area around bore (11) to 230 to 250°F (110 to 130°C). Use heat gun. Measure temperature with pyrometer.
   b. Coat outside of liner (12) with primer (E291).
   c. Press liner (12) into bore (11).

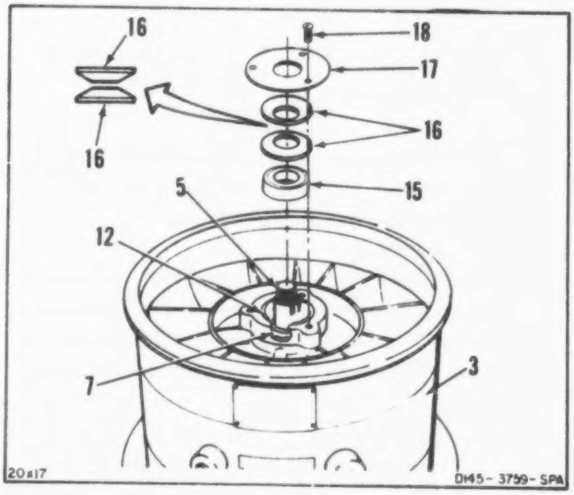
8. Pump grease (E190) into grease fitting (1) until grease flows from three holes (13) in sleeve (10).



9. Turn housing (3) over 180 degrees.
10. **Install shaft (5),** retainer (4), bearing (6), and spacer (7) in bore (11) through bottom of housing (3).
11. Install three screws (14). **Torque screws to 20 inch-pounds.** Lockwire screws to retainer (4). Use lockwire (E227).



12. Turn housing (3) over 180 degrees.
13. Pack bearing (15) with grease (E190). Install bearing in liner (12), seal end up, against spacer (7). Use brass or aluminum drift.
14. Coat two spring washers (16) with grease (E190). Install washers over shaft (5), small ends against each other.
15. **Install liner retainer (17)** and three screws (18). **Torque screws to 20 inch-pounds.** Lockwire screws to retainer. Use lockwire (E227).



*INSPECT*

*GO TO NEXT PAGE*

## 6-143 ASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-143

*INSPECT*

16. **Install key (19)** in slot (20) in shaft (5).

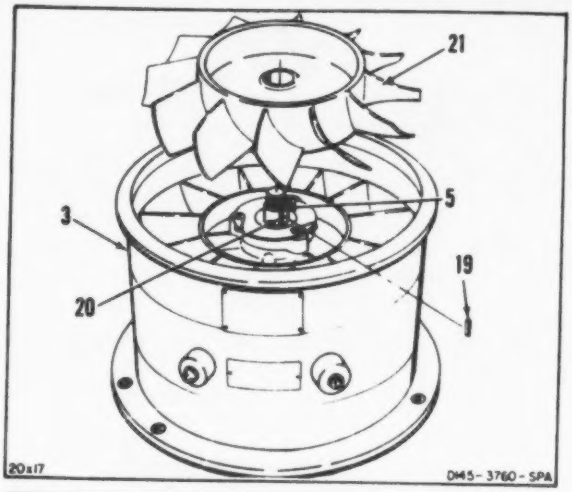
**CAUTION**

**If impeller is installed upside down, fan will not operate correctly. Transmission will overheat.**

17. Apply light coat of grease (E190) to shaft (5). **Install second stage impeller (723010) (21)** on shaft over key (19), part number away from housing (3) and vanes angled down to right.

**NOTE**

Part number is stamped on one face of impeller hub.

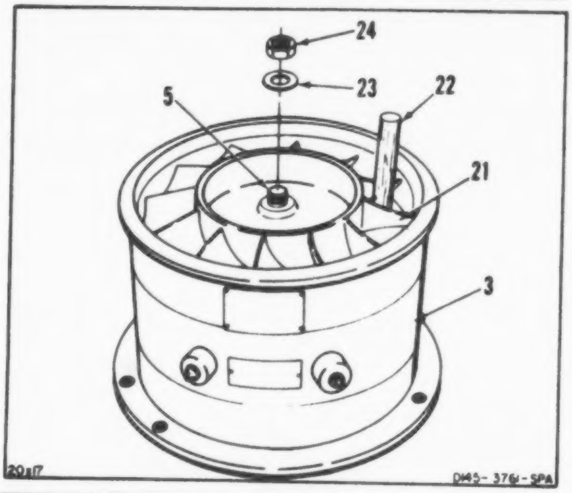


18. Clean thread on shaft (5) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186) and goggles

**NOTE**

Wood dowel keeps impeller from turning when torquing nut.

19. Insert wood dowel (22) between vanes of impeller (21) and housing (3).
20. **Install** washer (23) and **nut (24)** on shaft (5). **Torque nut to 400 inch-pounds.**
21. Remove dowel (22).



22. Turn housing (3) over 180 degrees and **install key (25)** in slot (26) of shaft (5).

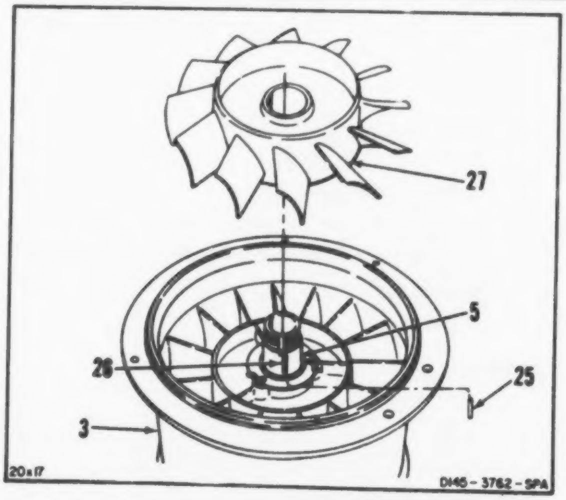
**CAUTION**

**If impeller is installed upside down, fan will not operate correctly. Transmission will overheat.**

23. Apply light coat of grease (E190) to shaft (5). **Install first stage impeller (723008) (27)** on shaft over key (25), with part number toward housing (3) and vanes angled up to left.

**NOTE**

Part number is stamped on one face of impeller hub.



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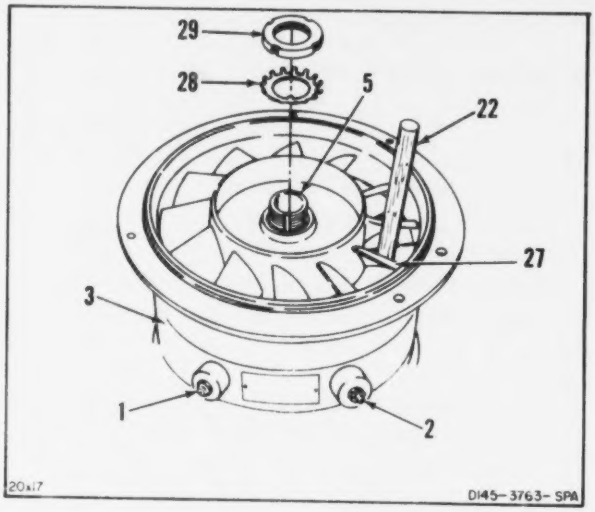
## 6-143 ASSEMBLE AFT TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-143

24. Clean thread on shaft (5) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186) and goggles.

**NOTE**

Wood dowel keeps impeller from turning when torquing nut.

25. Install wood dowel (22) between vanes of impeller (27) and housing (3).
26. **Install tangwasher (28) and nut (29)** on shaft (5). **Torque nut to 150 inch-pounds.** Use spanner wrench.
27. **Torque nut (29) up to 160 inch-pounds** as needed to align tang and groove. Bend one tang of tangwasher (28) into one groove on nut.
28. Remove wood dowel (22).
29. Pump grease (E190) into grease fitting (1) until grease comes out of vent fitting (2). Wipe off excess grease. Use cloth (E120).



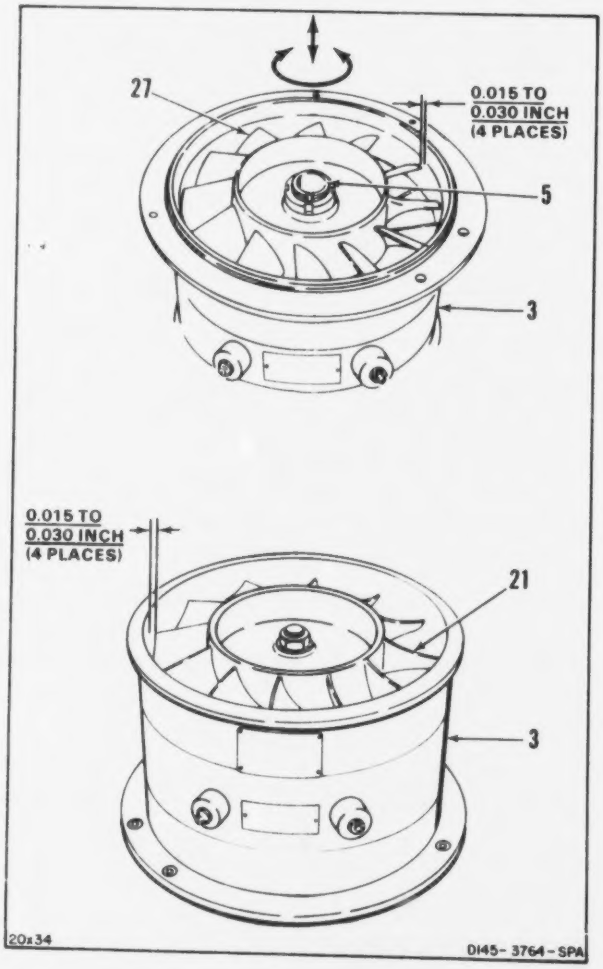
*CHECK ASSEMBLY*

30. **Rotate shaft (5)** by hand several turns. There shall be no binding or noise.
31. **Try to move shaft (5)** in and out of housing (3). There shall be no free play in shaft.
32. **Measure gap between vanes of impellers (21 and 27) and side of housing (3)** at four places 90 degrees apart around housing. Gap shall be 0.015 to 0.030 inch.

*INSPECT*

FOLLOW-ON MAINTENANCE:

None


27
0.015 TO 0.030 INCH (4 PLACES)
5
3
0.015 TO 0.030 INCH (4 PLACES)
21
3
20x34
D145-3764-SPA

**END OF TASK**

## 6-144 INSTALL AFT TRANSMISSION OIL COOLER FAN 6-144

INITIAL SETUP

***Applicable Configurations:***
All

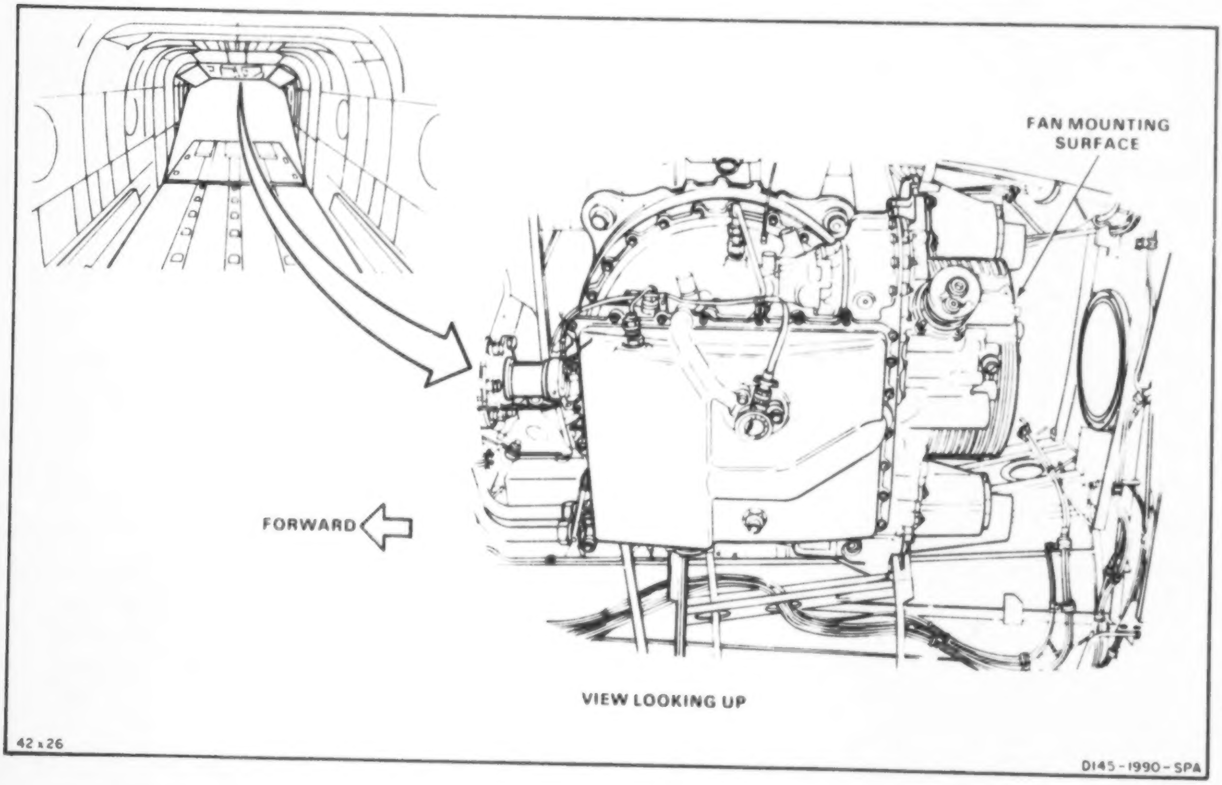
***Tools:***
Aircraft Mechanic's Tool Kit
NSN 5180-00-323-4692
Hand Lubricating Gun
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Oil (E254)
Gloves (E186)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P


FAN MOUNTING SURFACE
FORWARD
VIEW LOOKING UP
42 x 26
D145-1990-SPA

**GO TO NEXT PAGE**

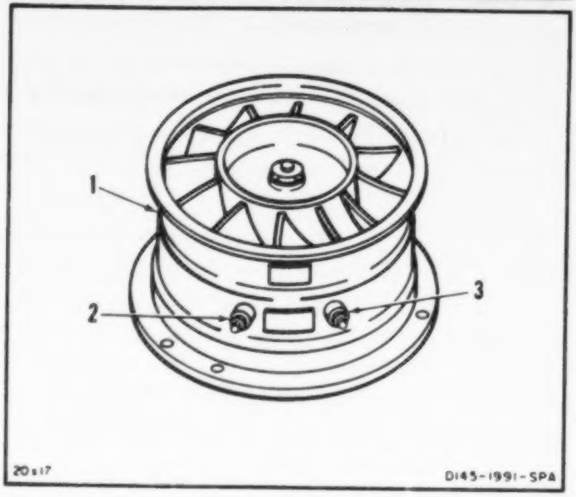
## 6-144 INSTALL AFT TRANSMISSION OIL COOLER FAN (Continued) 6-144

1. Check the torque of the fan retaining nut. **Torque nut to 400 inch-pound.**

**CAUTION**

**Do not overgrease. Do not block vent fitting (3). Stop grease application as soon as clean grease comes out of vent fitting.**

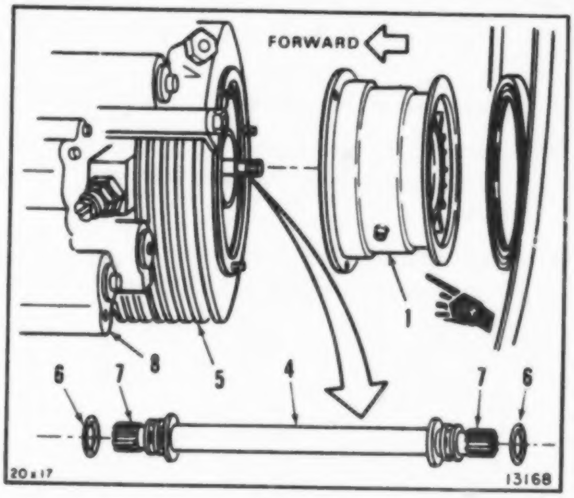
1.1 Apply grease (E190) to fan (1) at fitting (2) until clean grease comes out vent (3). Use hand lubricating gun.



2. **Remove drive shaft (4)** from oil cooler (5). Remove packings (6) from each end of shaft.

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



3. Clean splines (7) at both ends of shaft (4). Use solvent (E162) and clean cloths (E120). Wear gloves (E186).

3.1. Inspect splines (7) on drive shaft (4) for wear. If splines are worn, proceed as follows:

   a. Place a 6 inch metal ruler or equivalent straightedge along the length of splines (7), with ruler spanning worn area.
   b. Measure the depth of wear below the face of the spline. Use a feeler gage.
   c. If spline wear at fan end exceeds 0.010 inch, replace drive shaft (4) and fan (1).
   d. If spline wear at transmission end exceeds 0.010 inch, perform steps 6. thru 9. Replace aft transmission (8). (Refer to Tasks 6-92 and 6-97.)
   e. If wear is less than 0.010 inch, all parts are satisfactory for continued use.

4. Install packings (6) on each end of shaft (4).

5. Pack splines (7) and mating splines in transmission (8) and fan (1) with grease (E190).

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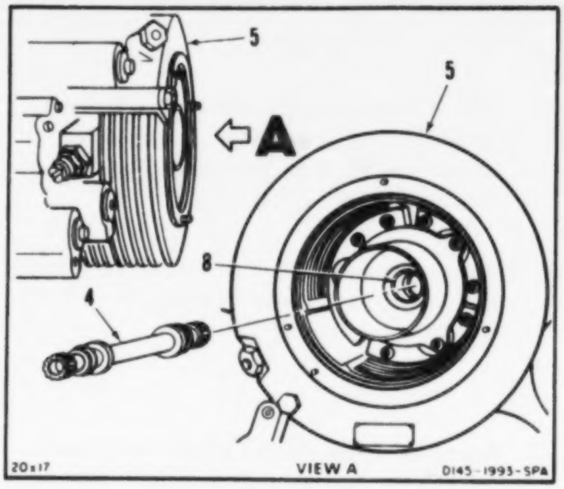
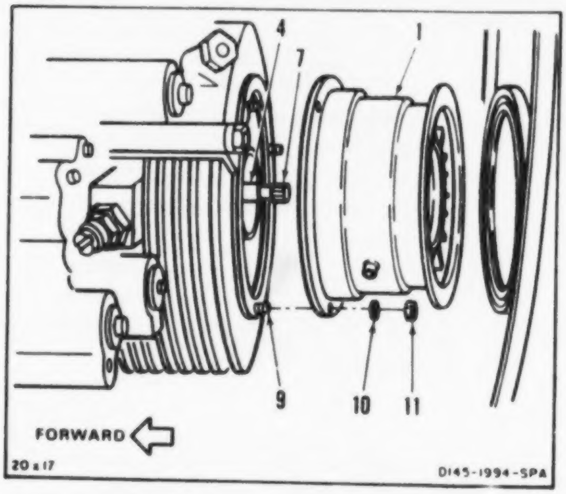
## 6-144 INSTALL AFT TRANSMISSION OIL COOLER FAN (Continued) 6-144

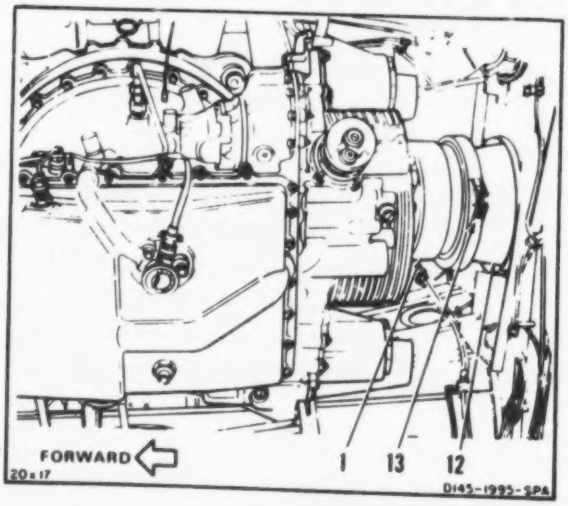
6. **Install shaft (4)** in transmission splines (8) within oil cooler (5).


5
5
A
8
4
20x17
VIEW A
D145-1993-SPA

7. **Install fan (1) on splines (7)** of shaft (4).
8. Rotate fan (1) to align mounting holes with four mounting studs (9). **Install fan on studs.**
9. Install four washers (10) and nuts (11). **Torque nuts to 60 inch-pounds.**


4
7
1
9
10
11
FORWARD
20x17
D145-1994-SPA

10. Slide exhaust duct (12) forward against fan (1).
11. Coat thread of clamp (13) with oil (E254). **Install clamp** around duct (12) and fan (1). **Torque clamp to 35 inch-pounds.**


FORWARD
20x17
1
13
12
D145-1995-SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-144.1 REPLACE AFT TRANSMISSION OIL COOLER BYPASS VALVE 6-144.1

INITIAL SETUP

***Applicable Configurations:***
All

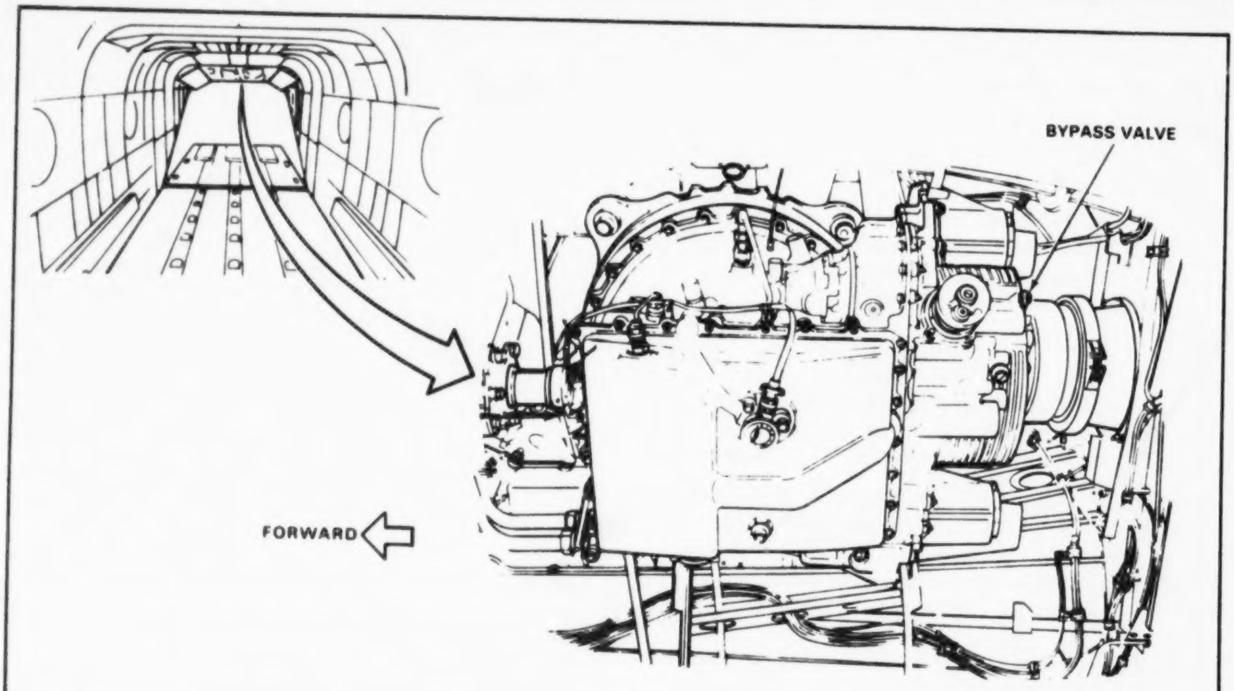
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 14-Quart
Socket, 1 1/2-Inch

***Materials:***
Lockwire (E231)
Oil (E254)
Cloths (E120)

***Parts:***
Packing (2)

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)



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## 6-144.1 REPLACE AFT TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-144.1

***DRAIN OIL COOLER***

1. Remove lockwire from drain plug (1) and bypass valve (2). **Remove drain plug** from oil cooler (3). Drain oil into container.
2. Remove packing (4) from drain plug (1).
3. Install packing (4) on drain plug (1). Install plug in cooler (3). **Torque plug to 80 inch-pounds.**

***REMOVE VALVE***

**NOTE**

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove bypass valve (2) from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (5) from valve (2).

***INSTALL VALVE***

**WARNING**

**Oil (254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

**Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**

6. Coat packing (5) and thread of bypass valve (2) with oil (E254). **Install packing** on valve.
7. Install valve (2) in oil cooler (3). **Torque valve to 80 inch-pounds.**
8. Lockwire valve (2) to drain plug (1). Use lockwire (E231).

***INSPECT***

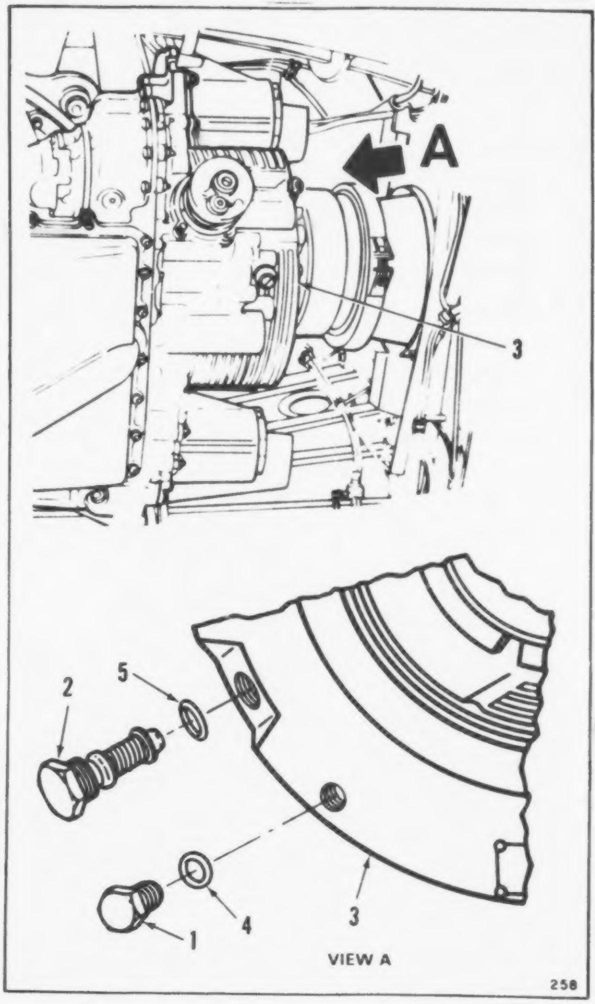
FOLLOW-ON MAINTENANCE:

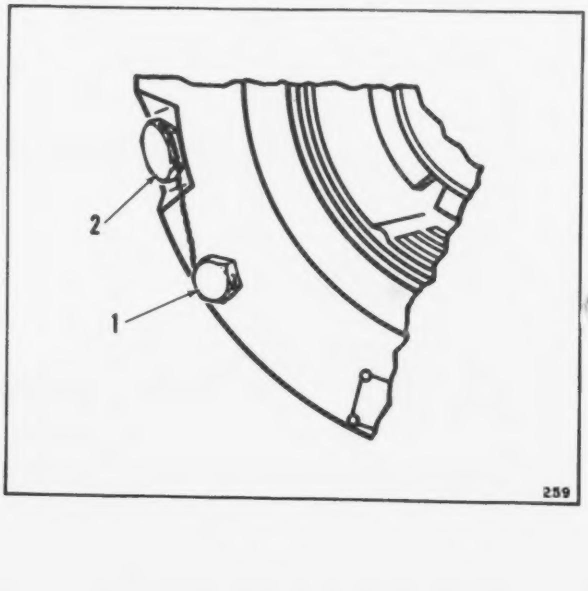
Service aft transmission (Task 1-54).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).





**END OF TASK**

## 6-145 REMOVE AFT TRANSMISSION OIL COOLER 6-145

INITIAL SETUP

***Applicable Configurations:***
All

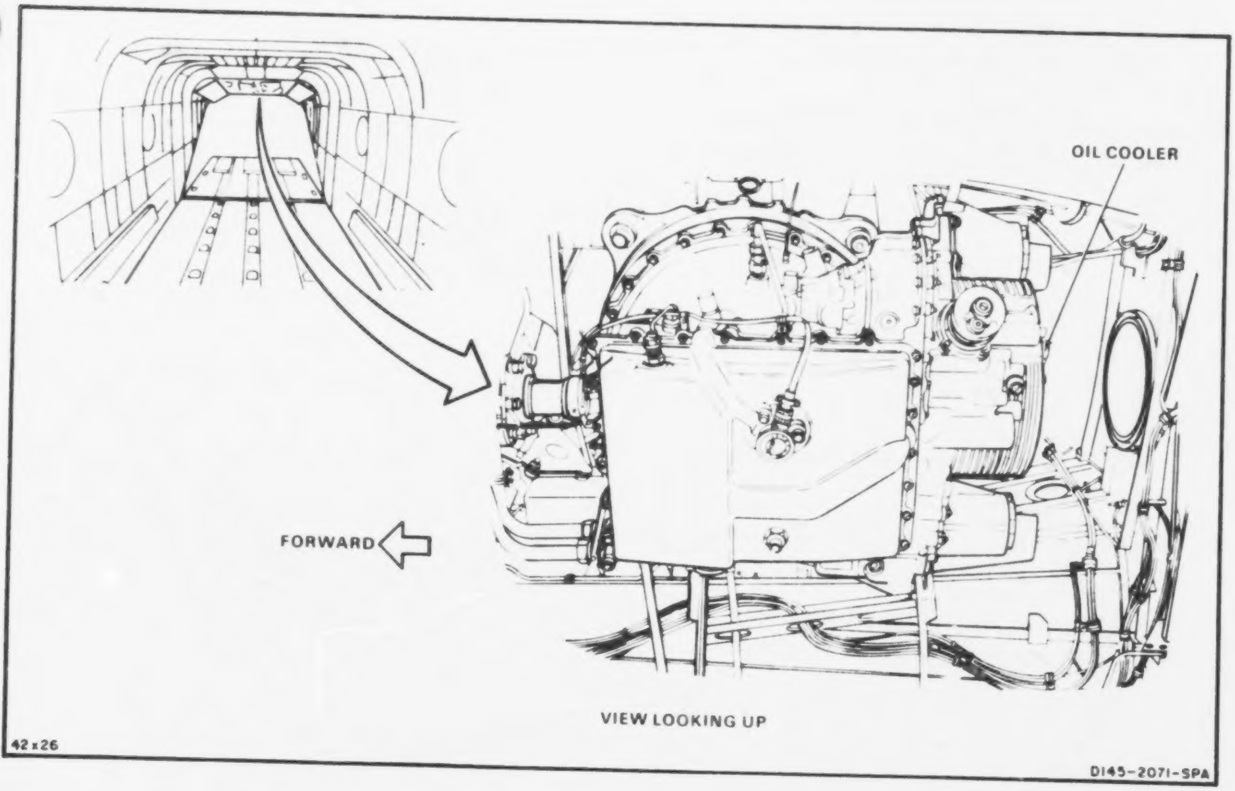
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 2-Quart
Wrench, 1 Inch

***Materials:***
Marking Pencil (E271)
Twine (E433)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)

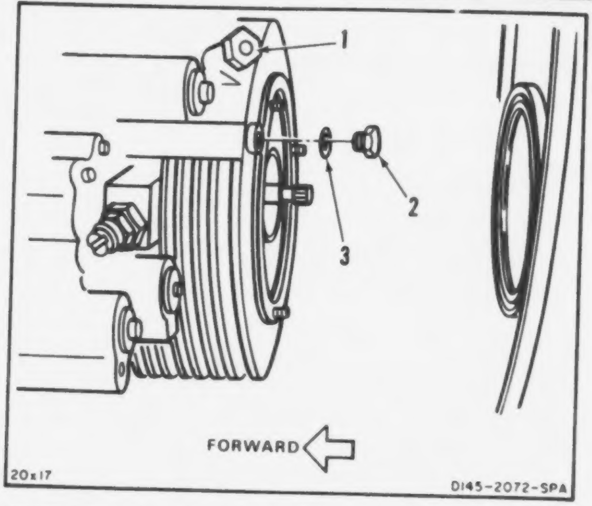
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Transmission Oil Cooler Fan Removed (Task 6-141)


OIL COOLER
FORWARD
VIEW LOOKING UP
42x26
D145-2071-SPA

**GO TO NEXT PAGE**

## 6-145 REMOVE AFT TRANSMISSION OIL COOLER (Continued) 6-145

1. Remove lockwire from plug (1) and drain plug (2). Remove drain plug and packing (3). **Drain oil** into container.
2. Install plug (2) and packing (3).


1
2
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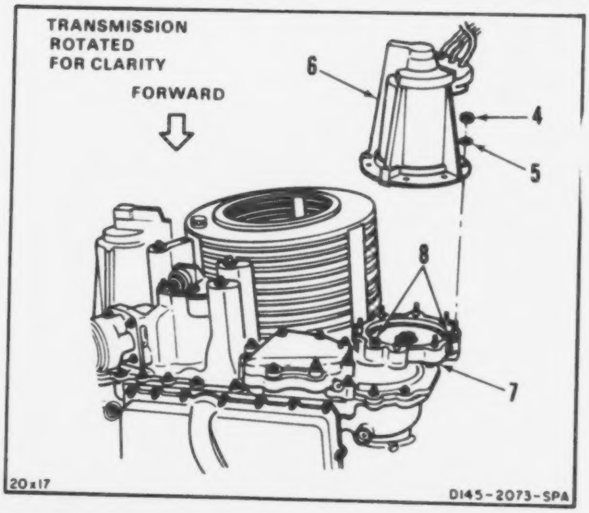
FORWARD
20x17
D145-2072-SPA

3. Remove eight nuts (4) and washers (5) from No. 2 ac generator (6).

**CAUTION**

**Do not damage oil transfer tubes when removing generator.**

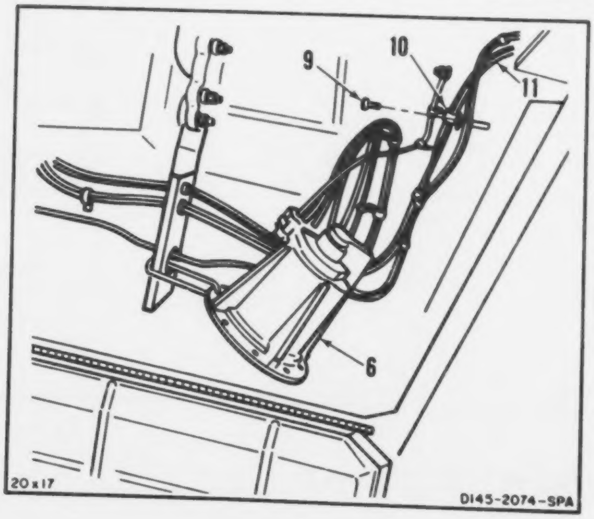
4. **Pull generator (6) straight back from transmission (7)** and two oil transfer tubes (8).


TRANSMISSION ROTATED FOR CLARITY
FORWARD
6
4
5
8
7
20x17
D145-2073-SPA

**CAUTION**

**Wiring can be damaged if generator is not supported.**

5. Tie generator (6) to structure at side of helicopter. Use twine (E433).
6. Remove screw (9). **Disconnect clamp (10). Move bundle (11) back for clearance.**


9
10
11
6
20x17
D145-2074-SPA

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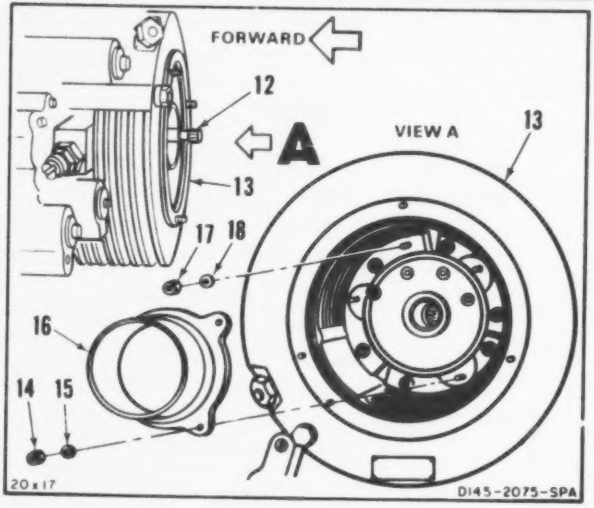
## 6-145 REMOVE AFT TRANSMISSION OIL COOLER (Continued) 6-145

7. **Remove fan drive shaft (12)** from oil cooler (13).

8. Remove three nuts (14) and washers (15) from baffle (16). **Remove baffle.**

9. Remove seven nuts (17) and washers (18).


FORWARD
12
A
VIEW A
13
13
17
18
16
14
15
20 x 17
D145-2075-SPA

10. If cooler (13) will be reinstalled, draw an alignment mark (19) on cooler and transmission (8). Use marking pencil (E271).

**CAUTION**

**Transfer tubes can be damaged if oil cooler is not supported during removal. Cooler weighs 35 pounds.**

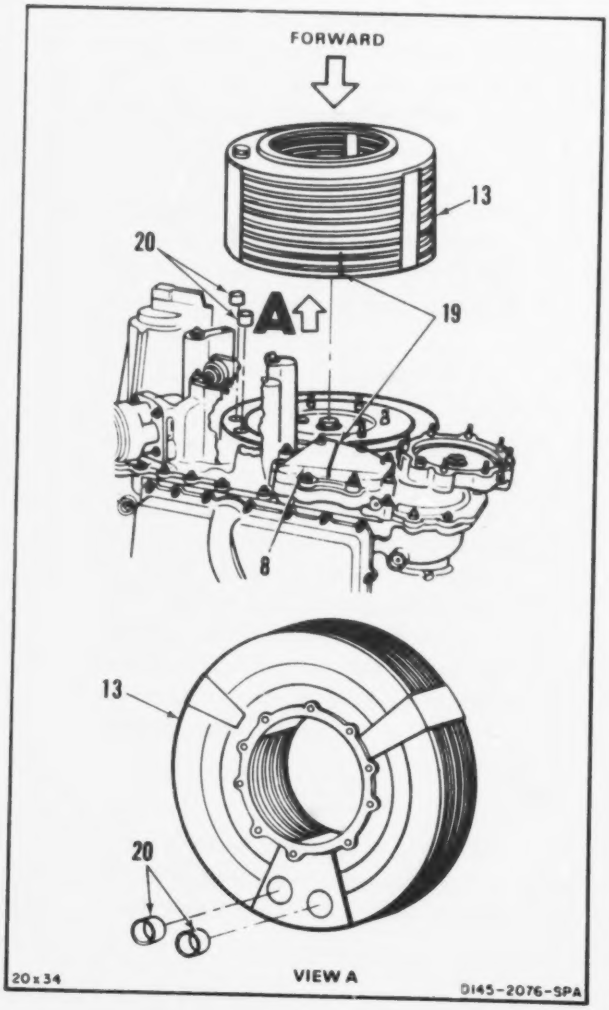
11. With aid of helper, **pull cooler (13) straight back from transmission (8)** to clear oil transfer tubes (20). Cap tubes or plug ports as needed to contain oil in cooler.

**NOTE**

Tubes may stay in cooler or transmission.

12. Guide cooler (13) aft and to right, away from transmission (8).

13. If tubes (20) remained in transmission (8), remove them. Install tubes in cooler (13).


FORWARD
13
20
A
19
8
13
20
VIEW A
20 x 34
D145-2076-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-145.1 REPAIR AFT TRANSMISSION OIL COOLER OUTSIDE SURFACE 6-145.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Depth Gage 643J
Goggles

***Materials:***
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Epoxy Primer (E293)
Epoxy Coating (E166)

***Personnel Required:***
68D20 Aircraft Powertrain Repairer
68D30 Inspector

***References:***
TM 43-0103
MIL-C-5541
MIL-C-22751

***Equipment Condition:***
Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

***GO TO NEXT PAGE***

## 6-145.1 REPAIR AFT TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued) 6-145.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

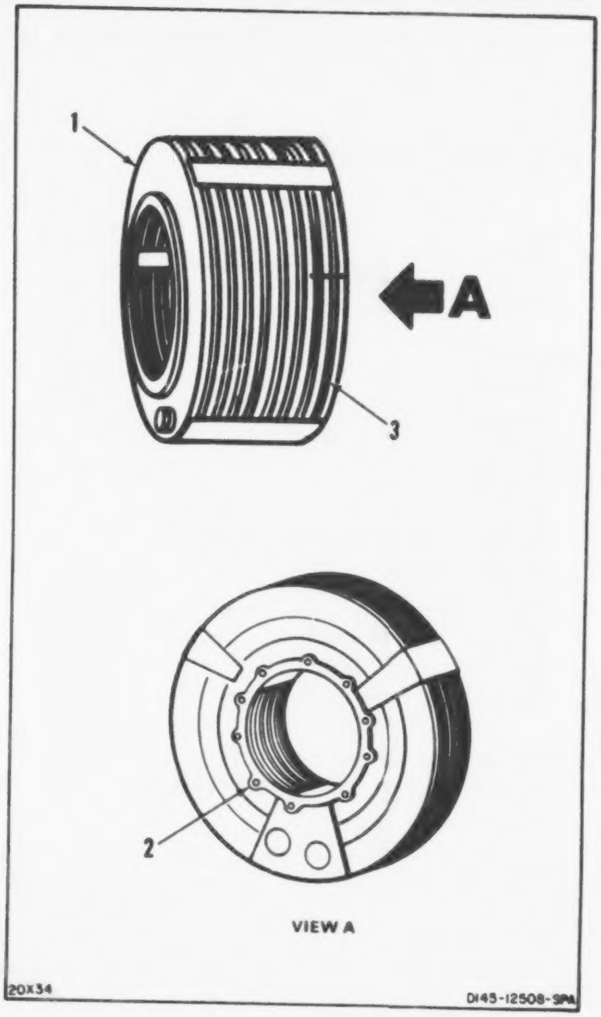
1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cooler (1).

**NOTE**

Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**
   b **Damage shall not extend over more than one surface or enter any radius.**
   c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**
   d. **More than 3 inches of fins (3) shall not be crushed beyond straightening.**
   e. **If any fin is bent more than 30 degrees, straighten it.**

3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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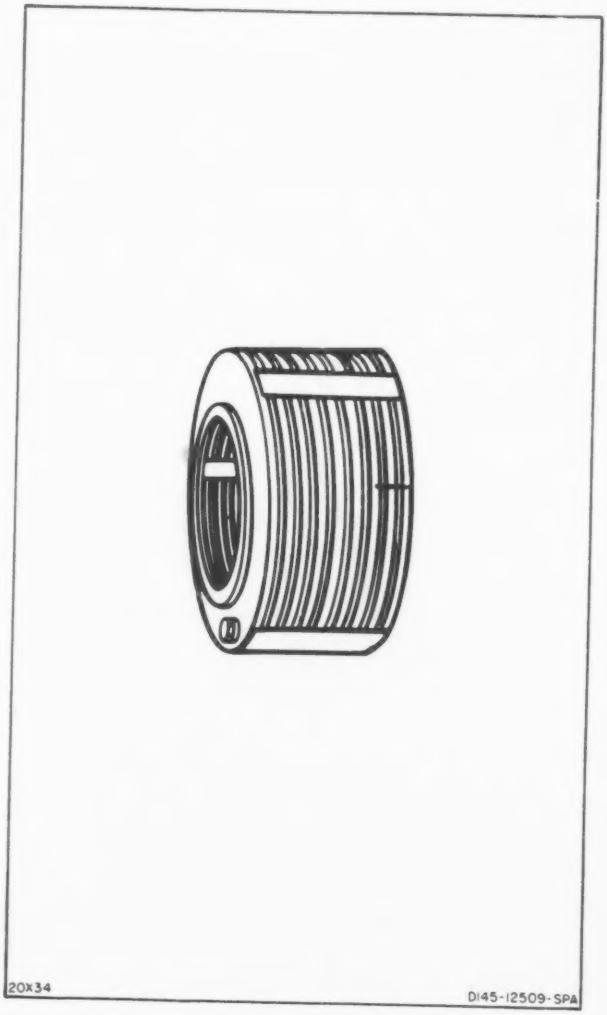
## 6-145.1 REPAIR AFT TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued)

6. Acid-etch reworked area as follows:
   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**
   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**
   c. **Rinse area with cold water.**
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean** reworked area **with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. **Swab on solution of alodine powder (E65) and water (MIL-C-5541). Use gauze sponges (E184). Swab for 2 to 5 minutes. Rinse area** with cold water and let air dry.
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.
11. **Apply epoxy topcoat (E166)** (MIL-C-22751).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-146 INSTALL AFT TRANSMISSION OIL COOLER 6-146

INITIAL SETUP

***Applicable Configurations:***
All

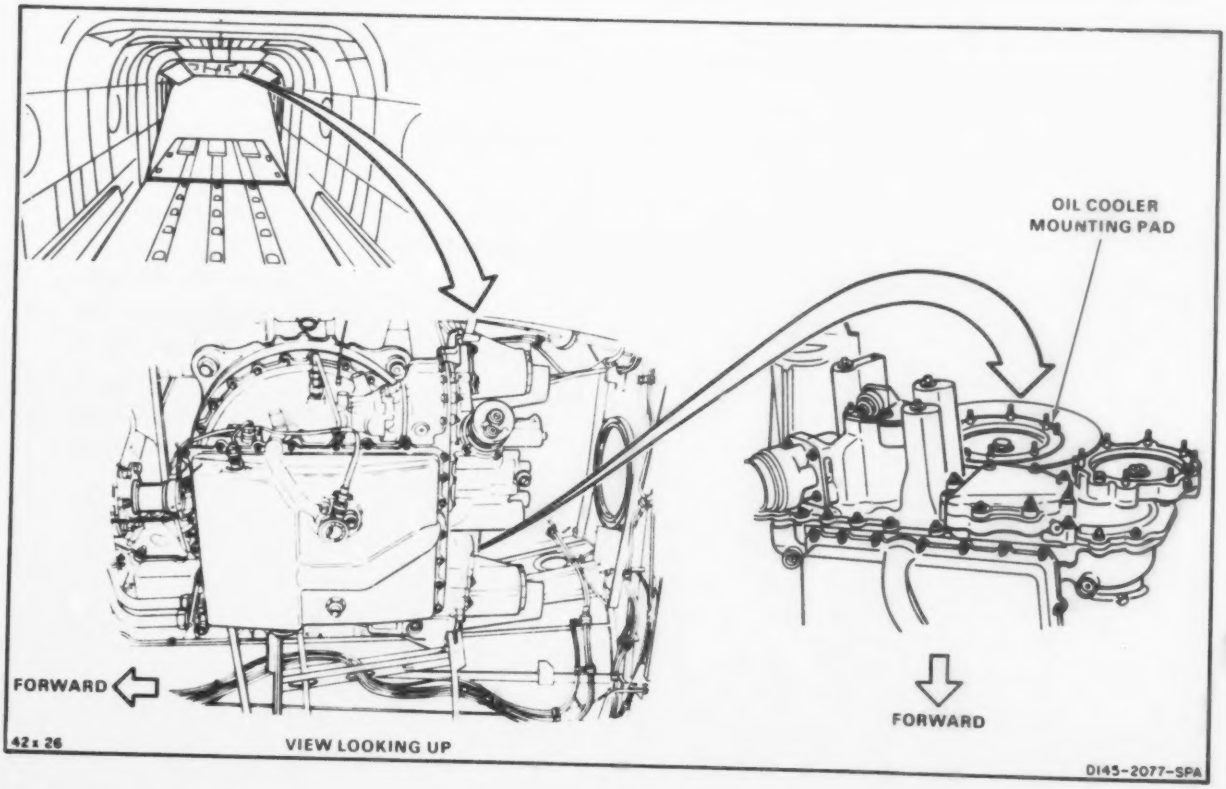
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***References:***
TM 55-1520-240-23P


OIL COOLER MOUNTING PAD
FORWARD
FORWARD
42 x 26
VIEW LOOKING UP
D145-2077-SPA

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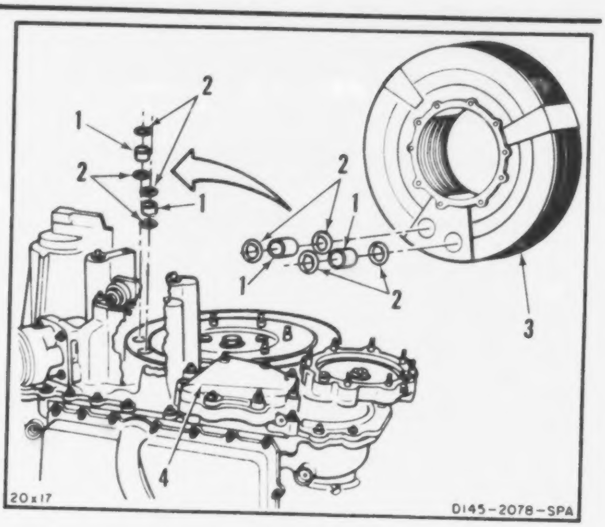
## 6-146 INSTALL AFT TRANSMISSION OIL COOLER (Continued) 6-146

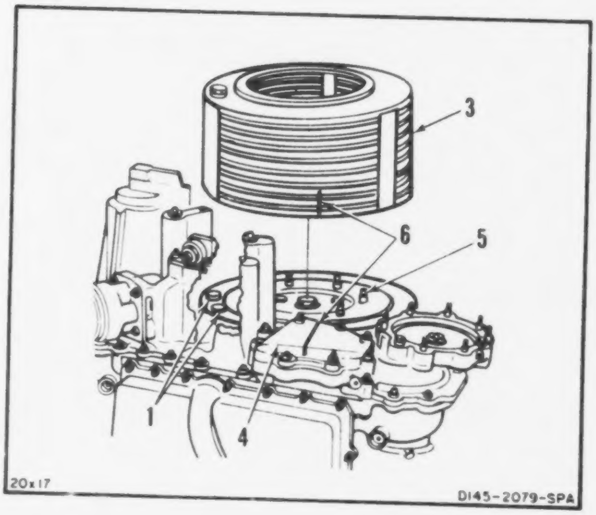
1. Remove two oil transfer tubes (1) and packings (2) from cooler (3). **Install two oil transfer tubes and packings in transmission (4).**


2
1
2
1
2
1
1
2
3
4
20x17
D145-2078-SPA

**CAUTION**

**Transfer tubes can be damaged if cooler is not aligned.**

2. Position cooler (3) against transmission (4) with aid of helper. Align cooler with tubes (1), studs (5), and alignment marks (6) (if applied). **Install cooler** on studs and tubes.


3
6
5
1
4
20x17
D145-2079-SPA

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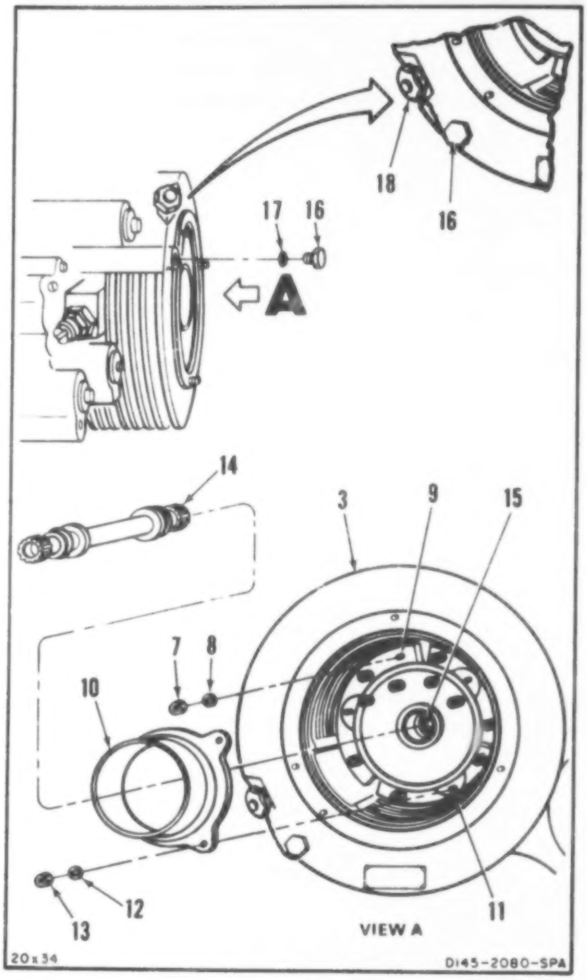
## 6-146 INSTALL AFT TRANSMISSION OIL COOLER (Continued) 6-146

3. Install seven washers (7) and nuts (8) on short studs (9). **Torque nuts to 60 inch-pounds.**
4. **Install baffle (10)** on three long studs (11). Install washers (12) and **nuts (13)** on studs. **Torque nuts to 60 inch-pounds.**
5. **Install fan drive shaft (14)** in transmission splines (15).
6. If cooler (3) is not a replacement, remove drain plug (16) and packing (17). **Install plug and new packing.** Lockwire drain plug to plug (18) with lockwire (E231).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16
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A
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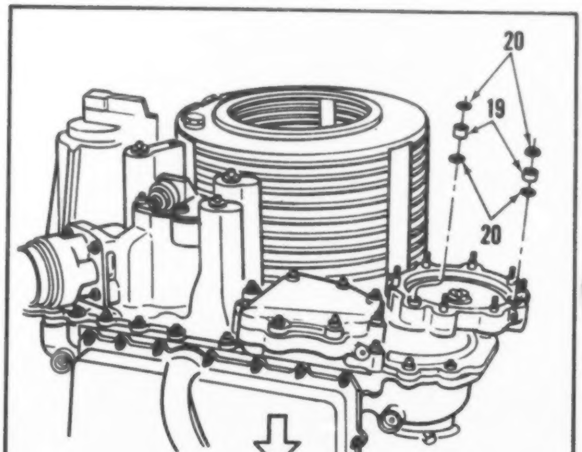
11
VIEW A
20x34
D145-2080-SPA

7. Remove two oil transfer tubes (19) and four packings (20). **Install tubes** and new packings.


20
19
20
FORWARD
20x17
D145-2081-SPA

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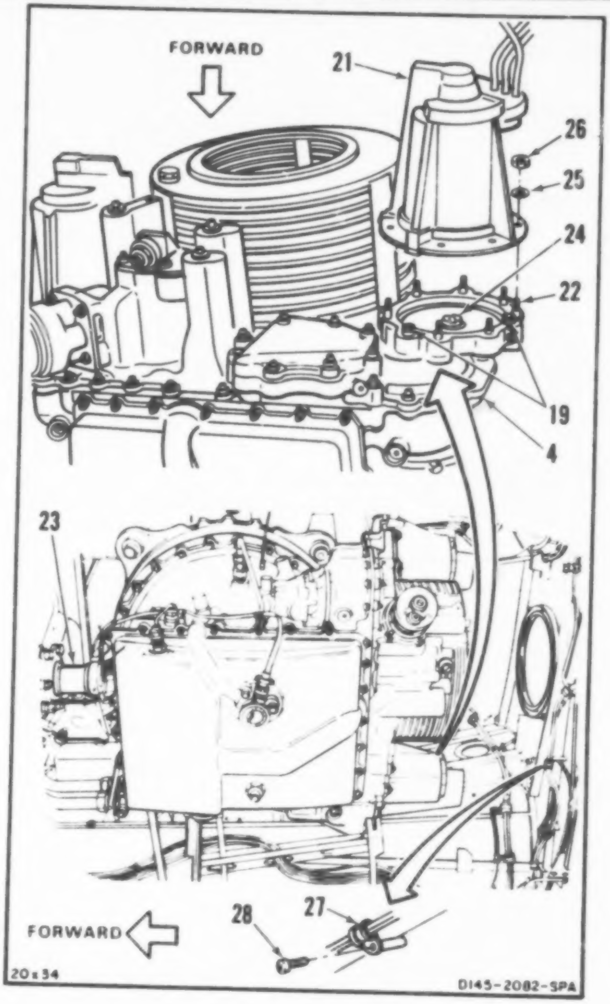
## 6-146 INSTALL AFT TRANSMISSION OIL COOLER (Continued) 6-146

8. Release generator (21) from stowed position. Align generator with studs (22) and transfer tubes (19). **Position generator** on transmission (4).

9. If needed, turn adapter and plate assembly (23) to align splines (24) with generator (21).

10. **Install eight** washers (25) and **nuts (26). Torque nuts to 120 inch-pounds.**

11. **Connect clamp (27)** with screw (28).


FORWARD
21
26
25
24
22
19
4
23
FORWARD
28
27
20x34
D145-2082-SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

Install aft transmission oil cooler fan (Task 6-144).

Service aft transmission (Task 1-54).

**END OF TASK**

## 6-147 REPLACE AFT TRANSMISSION OIL COOLER FAN DUCT

INITIAL SETUP

***Applicable Configurations:***
All

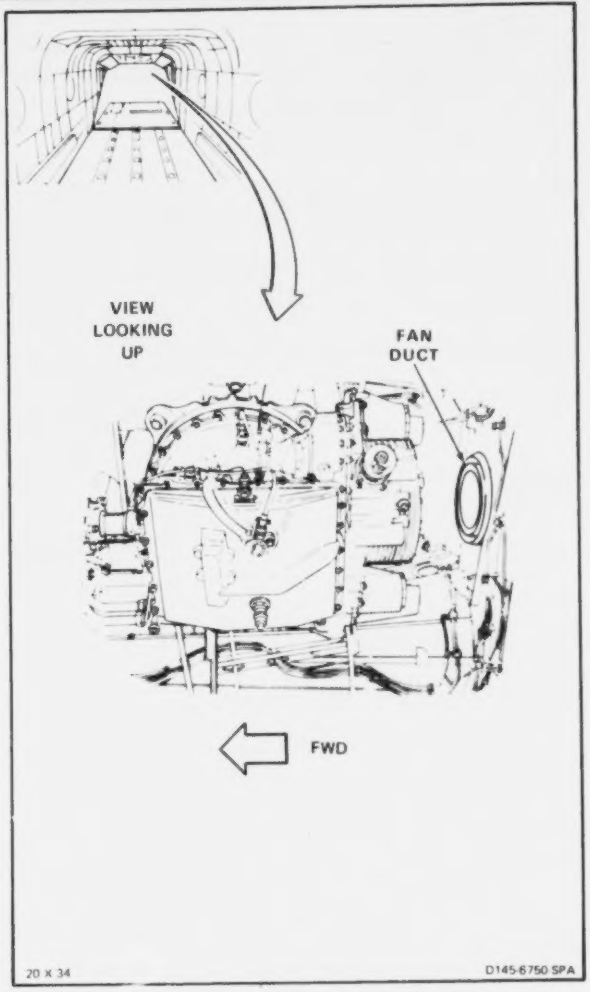
***Tools:***
Workstand

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Pan Removed (Task 2-3)
Aft Transmission Oil Cooler Fan Removed (Task 6-141)

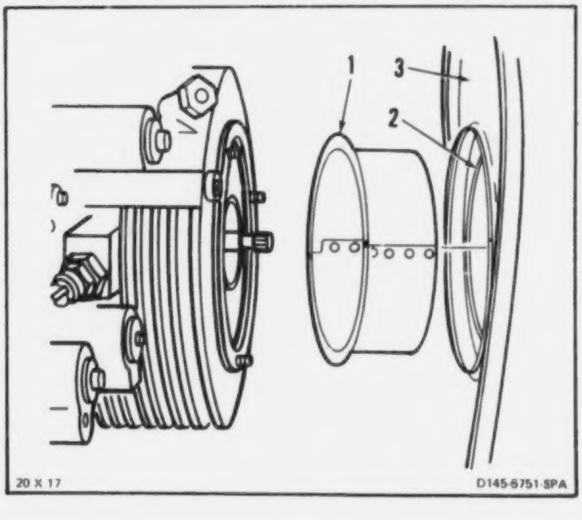


### REMOVE DUCT

1. Pull duct (1) out of seal (2) at bulkhead (3). **Remove duct.**

### INSTALL DUCT

2. **Install duct (1),** flared end forward, into seal (2) until flared end is against seal.



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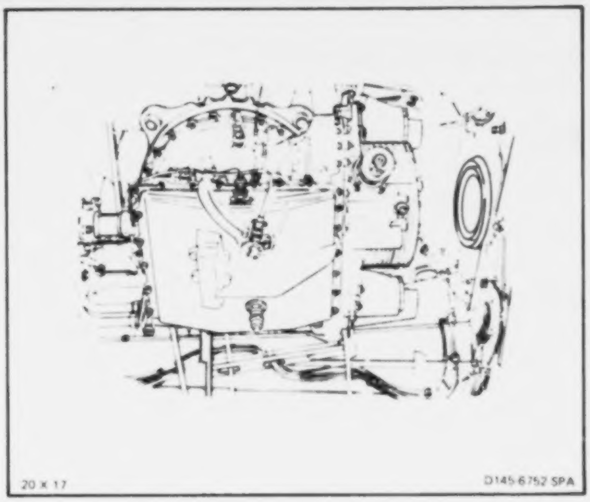
## 6-147 REPLACE AFT TRANSMISSION OIL COOLER FAN DUCT (Continued) 6-147



FOLLOW-ON MAINTENANCE:

Install oil cooler fan (Task 6-144).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

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## 6-148 REPLACE AFT TRANSMISSION MAIN OIL FILTER 6-148

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart

***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Lockwire (E231)
Gloves (E186)

***Parts:***
Packings
Filter

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

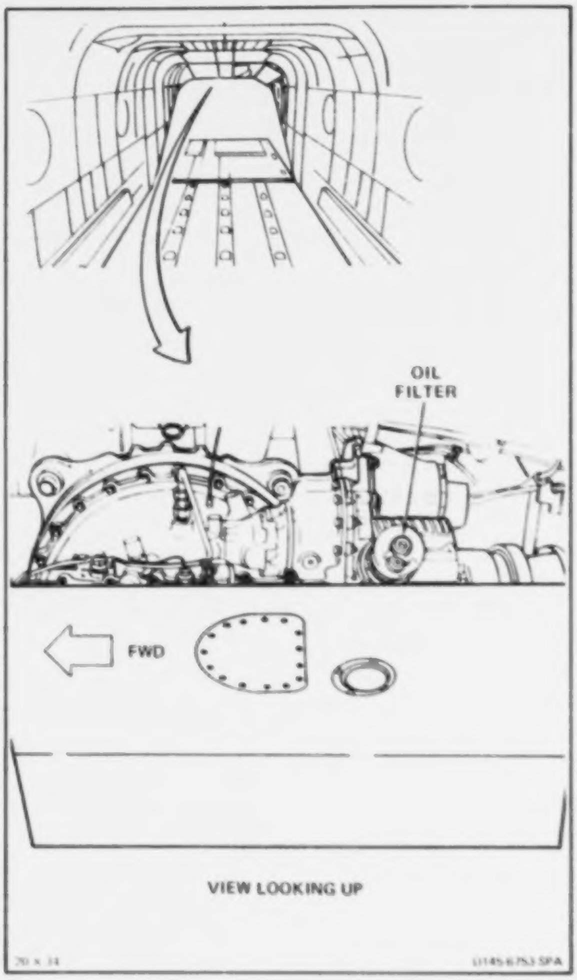
***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Left Baffle Under Aft Transmission Open (Task 2-2)

***General Safety Instructions:***

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**



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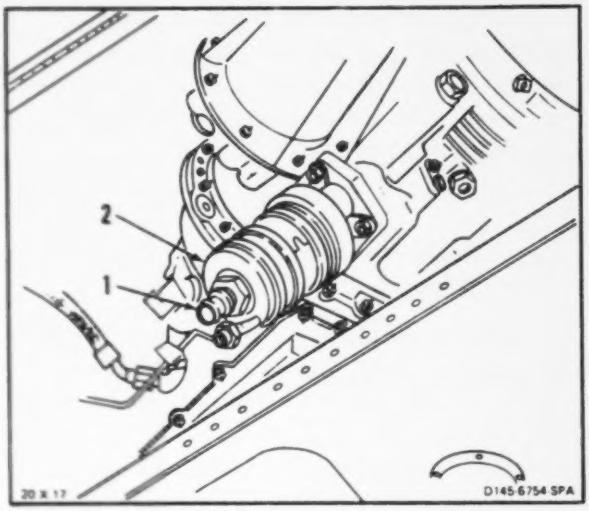
## 6-148 REPLACE AFT TRANSMISSION MAIN OIL FILTER (Continued) 6-148

*REMOVE FILTER*

**NOTE**

Filter bowl holds about 1 pint of oil.

1. Hold container under drain valve (1) of filter bowl (2). Push in and twist drain valve. **Drain oil** into container.

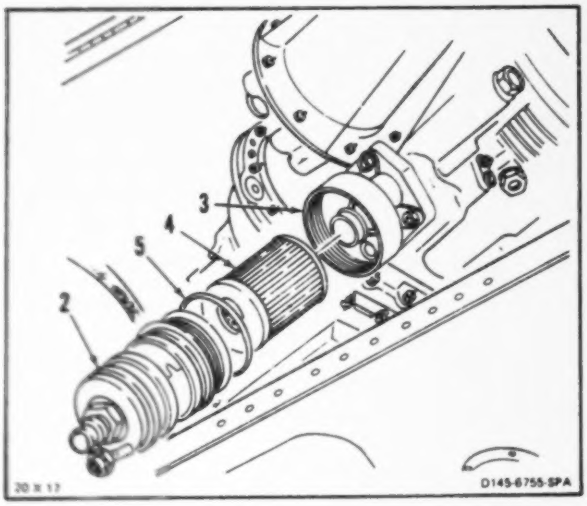


2. Remove lockwire from filter bowl (2). **Remove bowl** from housing (3).

**NOTE**

Filter may come out with bowl or stay in housing.

3. **Remove filter (4)** from bowl (2) or housing (3). Inspect filter for debris. If debris is found, perform a contamination analysis (Task 6-108).
4. Remove packing (5) from bowl (2).
5. Wipe inside of housing (3) clean. Use cloth (E120) damp with dry cleaning solvent (E162). Wear gloves (E186) and goggles.
6. Pour out any oil from bowl (2). **Check bottom of bowl.** If bowl contains deposits, go to step 7. If there is only a film of oil, with no deposits, go to step 11.



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## 6-148 REPLACE AFT TRANSMISSION MAIN OIL FILTER (Continued) 6-148

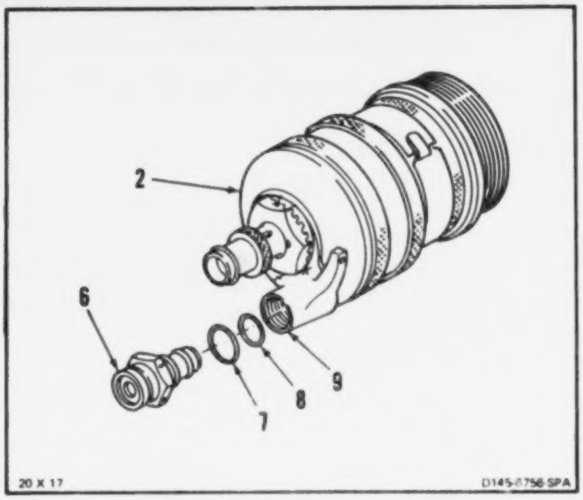
### *CLEAN BOWL*

7. Remove lockwire from pressure differential indicator (6). **Remove indicator.** Remove two packings (7 and 8) from indicator.
8. Flush bowl (2) with dry cleaning solvent (E162). Remove deposits with cloth (E120) damp with solvent (E162). Wear gloves (E186) and goggles.

**CAUTION**

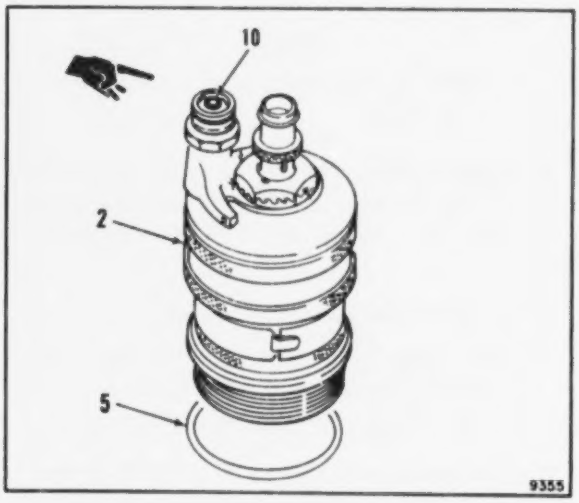
**Rigid tool could break and block holes.**

9. **Check that two holes in wall of indicator cavity (9) are clear.** Use lockwire (E231). Do not use a rigid tool such as a drill bit.
10. Install two packings (7 and 8) on indicator (6). **Install indicator in bowl (2).** Lockwire indicator to bowl. Use lockwire (E231).



### *INSTALL FILTER*

11. Position bowl (2) so that indicator button (10) points straight up. **Push in button to lock it down.**
12. Install packing (5) on bowl (2).



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## 6-148 REPLACE AFT TRANSMISSION MAIN OIL FILTER (Continued) 6-148

**NOTE**

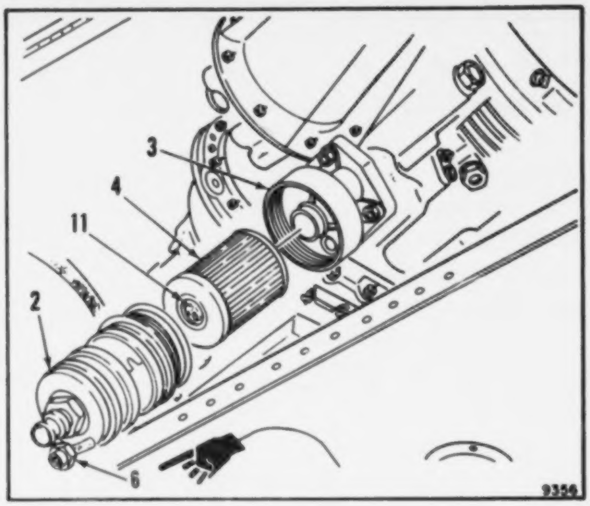
Do not install a used filter.

13. Check for packing (11) at each end of filter (4). Install new filter in bowl (2).

**NOTE**

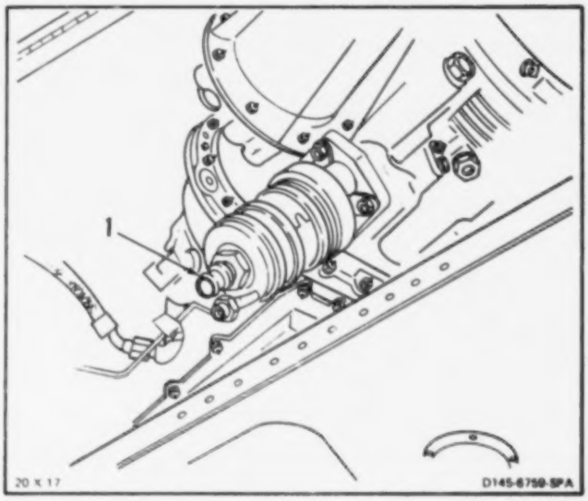
Make sure indicator is within 30 degrees of low point of filter bowl after tightening.

14. **Install bowl (2) and filter (4)** in housing (3). Tighten bowl by hand until it bottoms. Check that indicator (6) is within 30 degrees of low point of filter bowl. Lockwire bowl to housing. Use lockwire (E231).



15. Make sure drain valve (1) is closed.

***INSPECT***



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Perform ground run (TM 55-1520-240-10).

Close left baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-148.1 REPLACE AFT TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR 6-148.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two-Quart

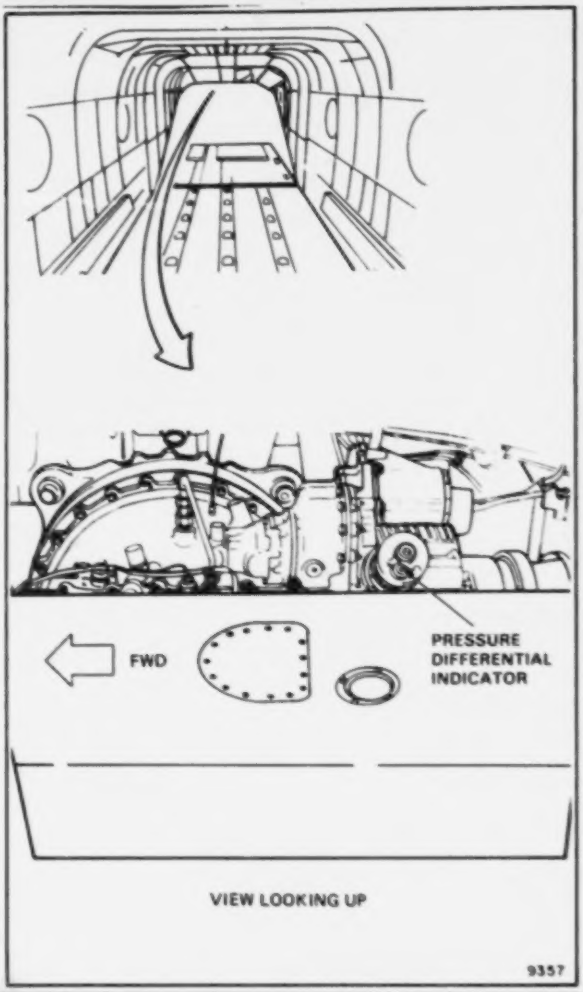
***Materials:***
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Left Baffle Under Aft Transmission Open (Task 2-2)

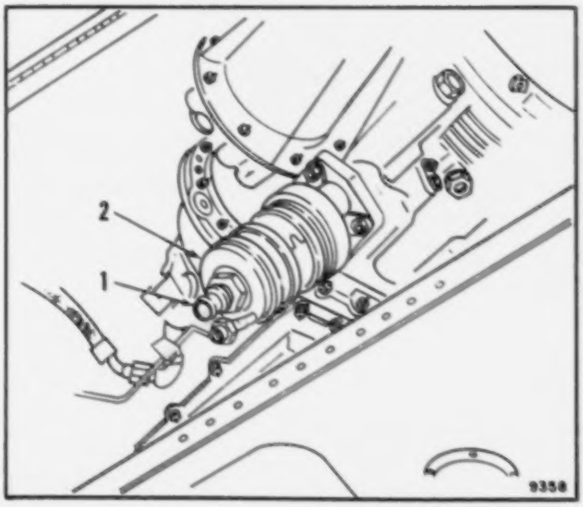


***DRAIN OIL***

**NOTE**

Filter bowl holds about 1 pint of oil.

1. Hold container under drain valve (1) of filter bowl (2). Push in and twist drain valve. **Drain oil** into container.
2. Close drain valve (1).



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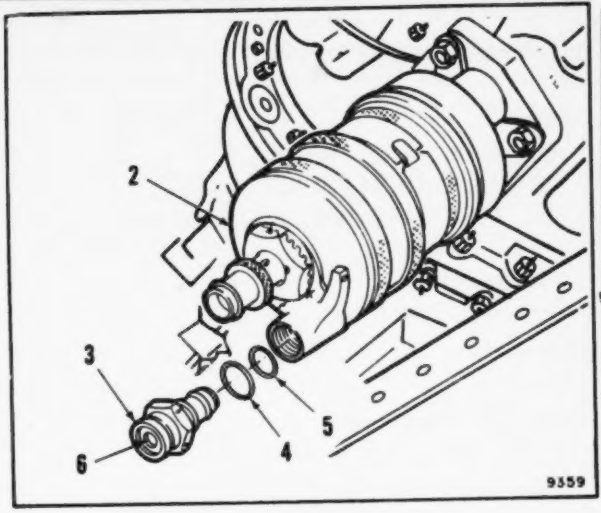
## 6-148.1 REPLACE AFT TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued) 6-148.1

***REMOVE INDICATOR***

3. Remove lockwire from pressure differential indicator (3). **Remove indicator** from filter bowl (2).
4. Remove two packings (4 and 5) from indicator (3).

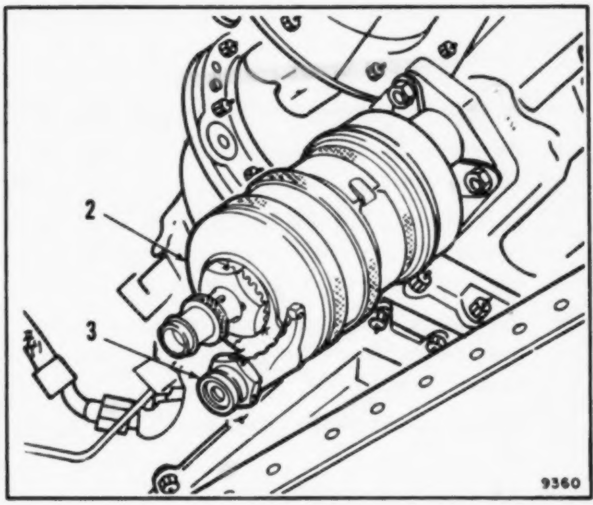
***INSTALL INDICATOR***

5. **Install two packings (4 and 5)** on indicator (3).
6. Hold indicator (3) so that button (6) points up. **Check that button is pushed in** and locked.
7. Install indicator (3) in bowl (2).



8. Lockwire indicator (3) to filter bowl (2). Use lockwire (E231).

***INSPECT***



FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Close left baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-149 REMOVE AFT TRANSMISSION MAIN OIL PUMP 6-149

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Bolt, 1/4-28, 3 Inches Long, 1 1/2-Inch Thread Length (2)
Workstand
Container, Two-Quart

***Materials:***

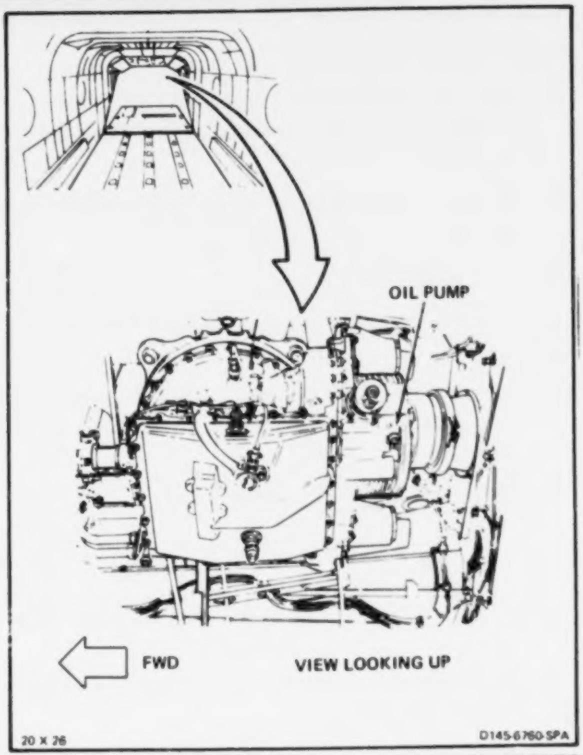
None

***Personnel Required:***

Medium Helicopter Repairer (2)

***Equipment Condition:***

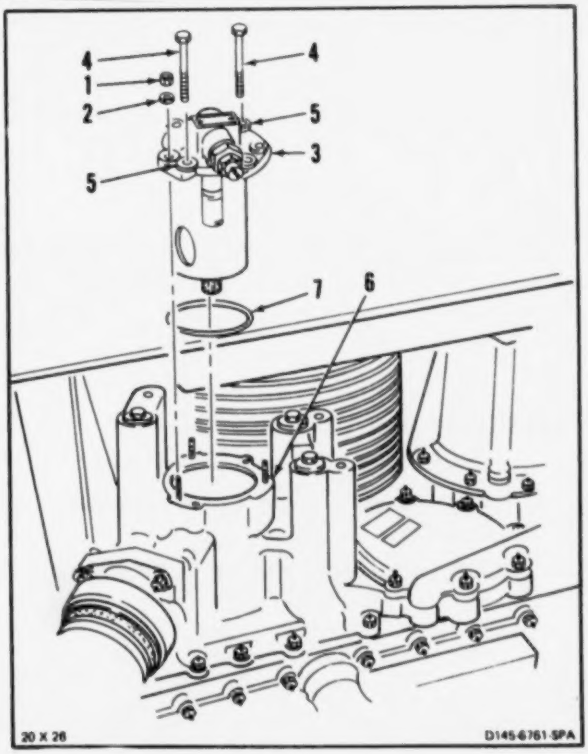
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



1. **Remove three nuts (1)** and washers (2) from pump (3).
2. **Install two 1/4-28 bolts (4)** in holes (5) in end of pump (3). Threaded length of bolts shall be at least **1 1/2-inches.**
3. Turn bolts (4) to jack pump (3) out of transmission (6). **Remove pump.** Use container to catch spilled oil.
4. Remove bolts (4) and packing (7) from pump (3).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-150 INSTALL AFT TRANSMISSION MAIN OIL PUMP 6-150

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

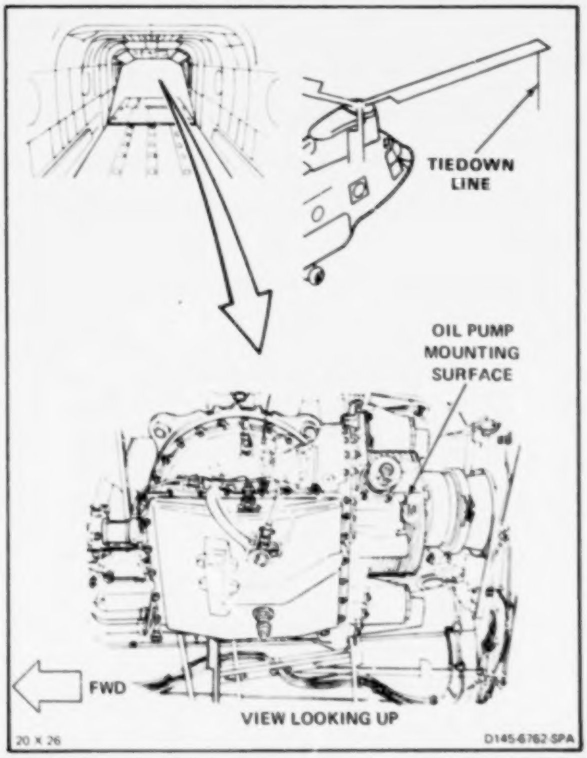
***Materials:***
None

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U20 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Tiedown Line Installed On One Forward Blade (Task 1-26)


TIEDOWN LINE
OIL PUMP MOUNTING SURFACE
FWD
VIEW LOOKING UP
20 X 26
D145-6762-SPA

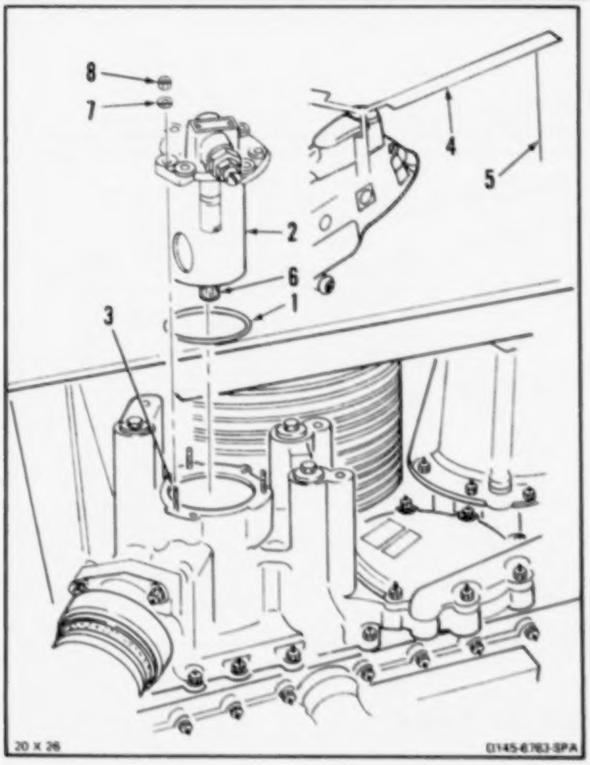
1. Install packing (1) on pump (2).

**WARNING**

**Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.**

2. **Install pump (2)** slowly and carefully on three studs (3). Have helper pull blade (4) around with tiedown line (5) as needed to align splines in transmission with splines of pump drive shaft (6).
3. **Install three** washers (7) and **nuts (8)** on studs (3). **Torque nuts to 60 inch-pounds.**

***INSPECT***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20 X 26
D145-6763-SPA

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## 6-150 INSTALL AFT TRANSMISSION MAIN OIL PUMP (Continued) 6-150

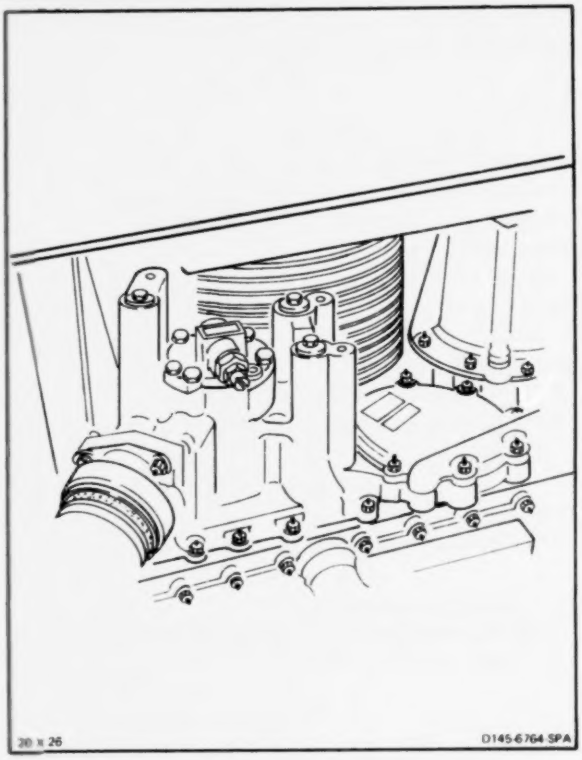
FOLLOW-ON MAINTENANCE:

Service aft transmission with oil (Task 1-54).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-151 ADJUST AFT TRANSMISSION MAIN OIL PUMP 6-151

INITIAL SETUP

***Applicable Configurations:***
All

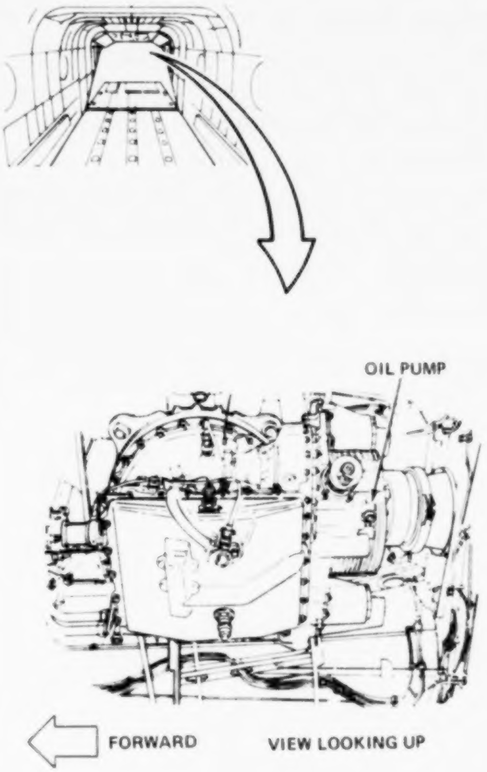
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Lockwire (E230)

***Personnel Required:***
Medium Helicopter Repairer
Inspector
Army Rotary-Wing Aviator (2)

***References:***
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



D145-10884-SPA

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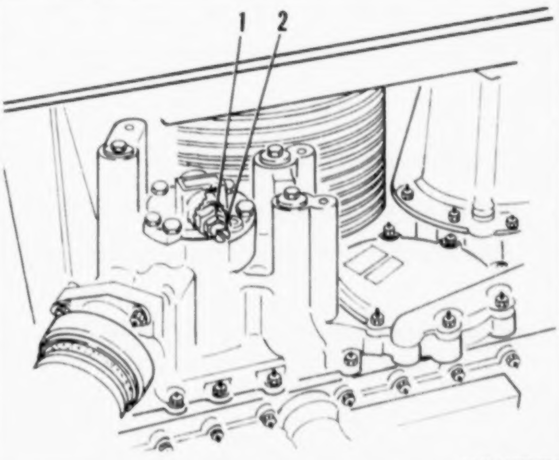
1. Remove lockwire from locknut (1). Hold setscrew (2) and **loosen locknut.**
2. **Turn setscrew (2) no more than 1/4 turn to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is 40 to 70 psi.
3. Hold setscrew (2). **Torque locknut (1) to 60 inch-pounds.**

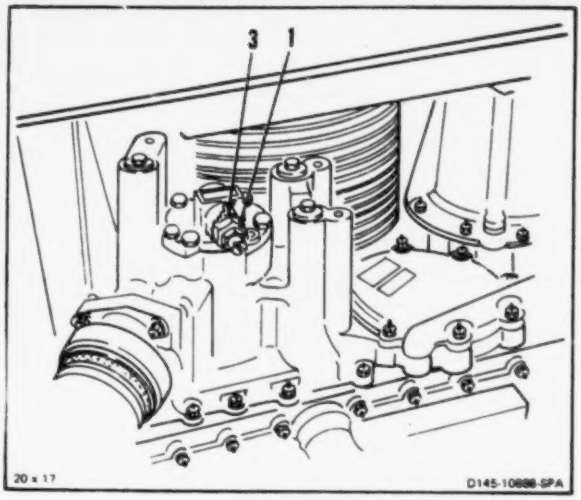


D145-10885-SPA

***GO TO NEXT PAGE***

## 6-151 ADJUST AFT TRANSMISSION MAIN OIL PUMP (Continued) 6-151

4. Have pilot perform ground run at 100 percent rotor rpm until transmission temperature and pressure stabilize. **Record aft transmission oil pressure.**
5. If oil pressure is 40 to 70 psi, go to step 6. **If pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) to retaining nut (3). Use lockwire (E230).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

# 6-152 REMOVE AFT TRANSMISSION AUXILIARY OIL PUMP 6-152

INITIAL SETUP

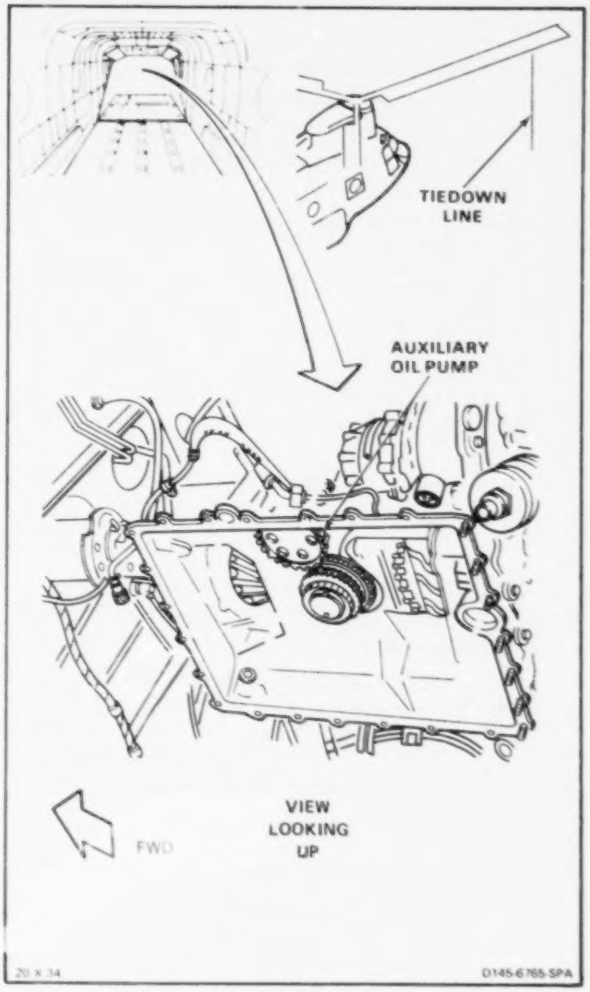
***Applicable Configurations:***
All

***Tools:***
Powertrain Tool Kit, NSN 5180-00-323-5267
1/4-28 Bolt, 3-Inches Long, 1 1/2-Inch Thread Length (2)

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
68D20 Powertrain Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Aft Transmission Sump Removed (Task 6-78)
Tiedown Line Installed On One Forward Blade (Task 1-26)



***General Safety Instructions:***

**WARNING**

**Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.**

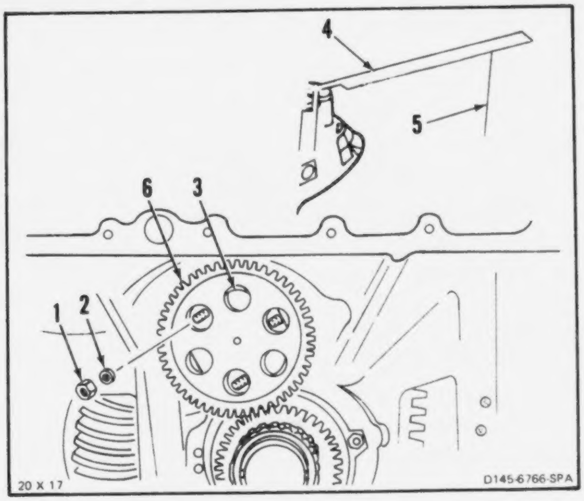
**WARNING**

**Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.**

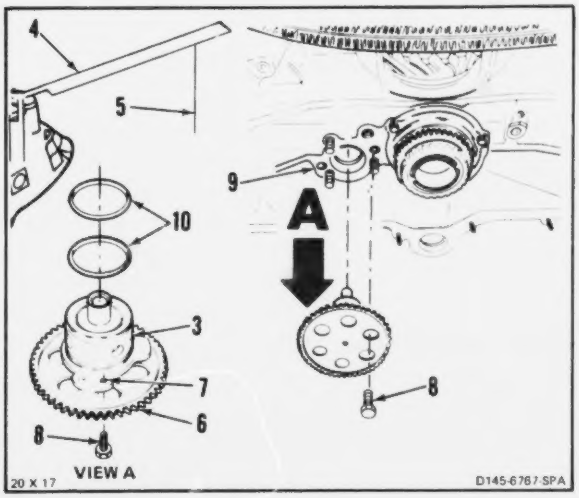
***GO TO NEXT PAGE***

## 6-152 REMOVE AFT TRANSMISSION AUXILIARY OIL PUMP (Continued) 6-152

1. **Remove three nuts (1)** and washers (2) from pump (3). Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with nuts.



2. Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with two extra holes (7) in pump (3). **Install 1/4-28 bolt (8) in each hole.** Threaded length of bolts shall be at least 1 1/2 inches.
3. Turn bolts (8) to jack pump (3) out of transmission (9). **Remove pump.**
4. Remove two bolts (8) and two packings (10) from pump (3).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-153 INSTALL AFT TRANSMISSION AUXILIARY OIL PUMP 6-153

INITIAL SETUP

***Applicable Configurations:***
All

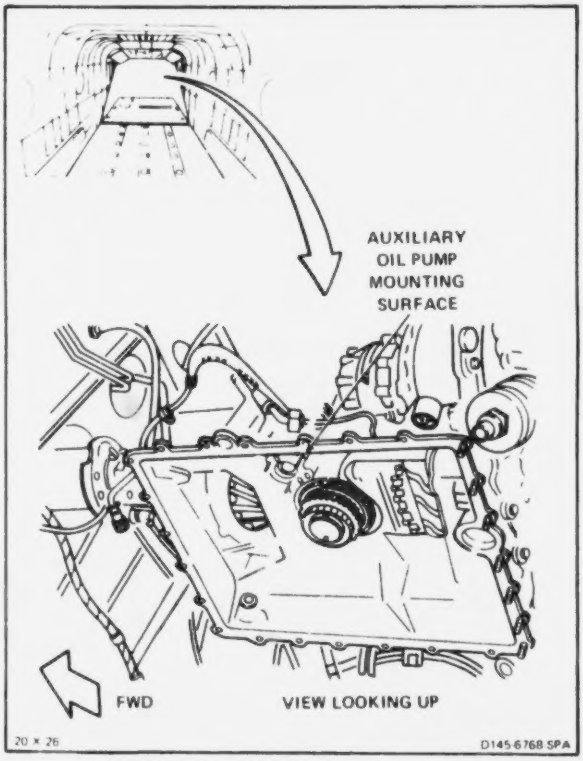
***Tools:***
Powertrain Tool Kit,
NSN 5180-00-323-5267
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
None

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
68D20 Powertrain Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

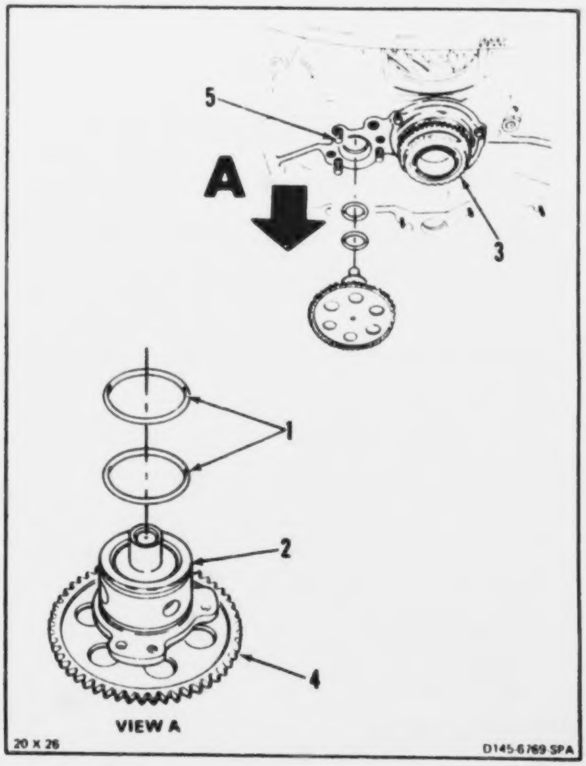

AUXILIARY OIL PUMP MOUNTING SURFACE
FWD
VIEW LOOKING UP
20 × 26
D145-6768 SPA

1. Install two packings (1) on pump (2).

CAUTION

**If drive gear teeth do not align with drive gear, pump can be damaged.**

2. **Align teeth** of pump drive gear (3) with teeth of transmission drive gear (4). **Install pump (2)** on three studs (5).


5
A
3
1
2
4
VIEW A
20 × 26
D145-6769 SPA

***GO TO NEXT PAGE***

## 6-153 INSTALL AFT TRANSMISSION AUXILIARY OIL PUMP (Continued) 6-153

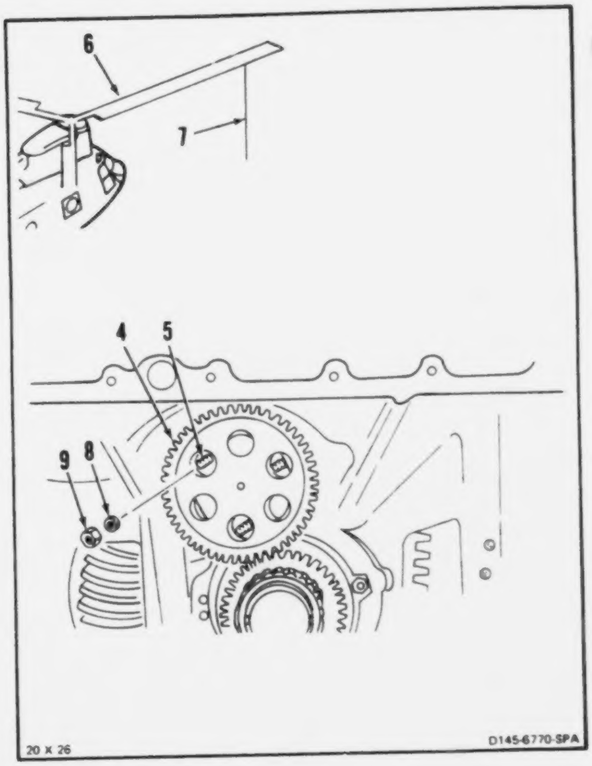
**WARNING**

**Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.**

**WARNING**

**Keep fingers away from drive gear as blades are turned. Turning gear can injure personnel.**

3. Have helper pull blade (6) around with tie-down line (7) as needed to align access holes in drive gear (4) with three studs (5). **Install three** washers (8) and **nuts (9). Torque nuts to 60 inch-pounds.**



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install aft transmission sump (Task 6-81).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-154 REPLACE AFT TRANSMISSION AUXILIARY OIL FILTER 6-154

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Torque Wrench, 0 to 150 Inch-Pounds
Workstand

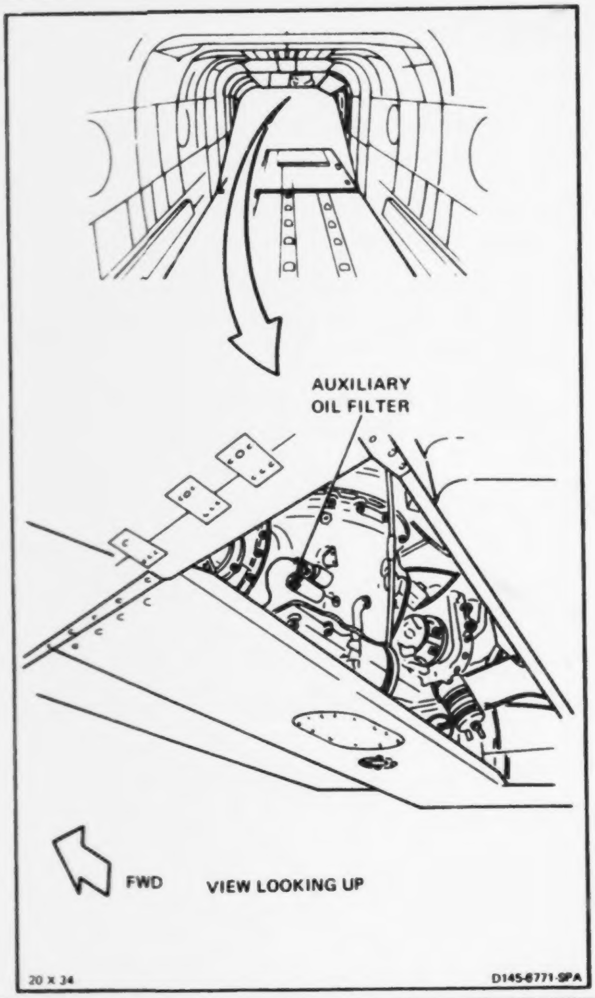
***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packing
Filter

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



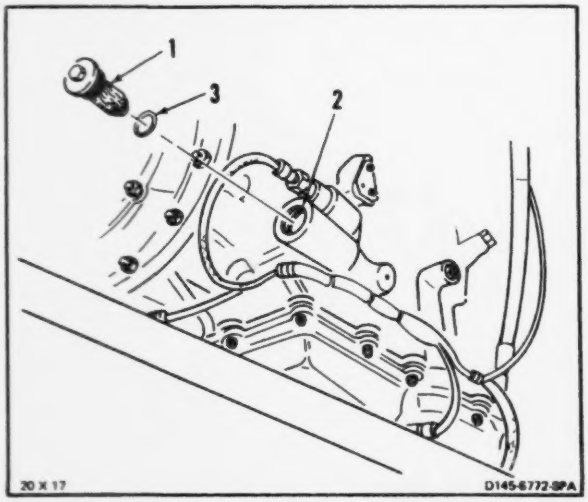
***REMOVE FILTER***

1. Remove lockwire from filter (1).

**CAUTION**

**Do not let debris enter transmission. Damage can result.**

2. **Remove filter (1)** from transmission cavity (2). Catch spilled oil in container. Remove packing (3) from filter.



***GO TO NEXT PAGE***

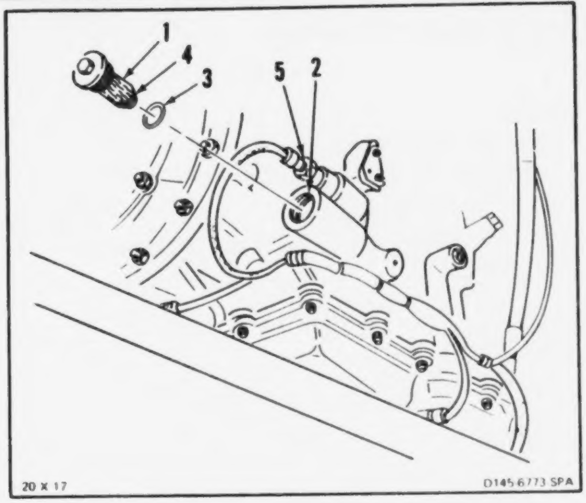
## 6-154 REPLACE AFT TRANSMISSION AUXILIARY OIL FILTER (Continued) 6-154

### *INSTALL FILTER*

**NOTE**

Filter is supplied with one packing installed. Do not install a used filter.

3. Coat packings (3 and 4) and thread of new filter (1) with oil (E254).
4. **Install filter (1)** and packing (3) in transmission cavity (2). **Torque filter to 80 inch-pounds.**
5. Lockwire filter (1) to auxiliary oil pressure switch (5). Use lockwire (E231).



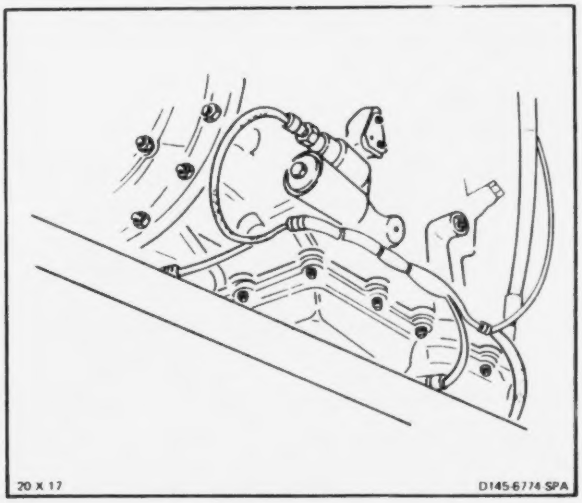
### *INSPECT*

### *INSPECT*

FOLLOW-ON MAINTENANCE:

Close baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-155 REMOVE AFT TRANSMISSION MAIN INLET SCREEN 6-155

INITIAL SETUP

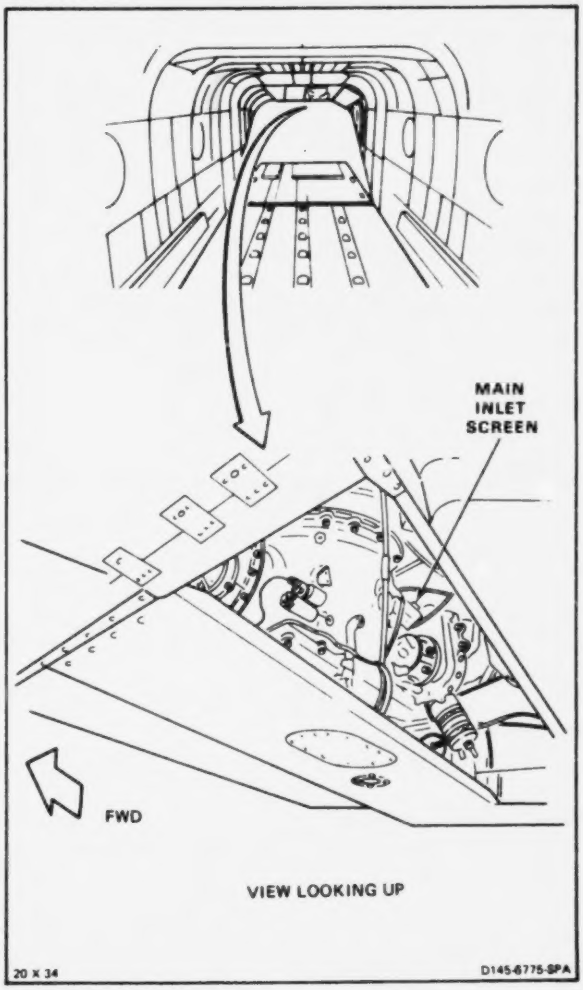
***Applicable Configurations:***
All

***Tools.***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Socket, 1-Inch
Workstand

***Materials:***
Barrier Material (E80)
Masking Tape (E388)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Left Baffle Under Aft Transmission Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)



1. Remove lockwire from screen (1).

**CAUTION**

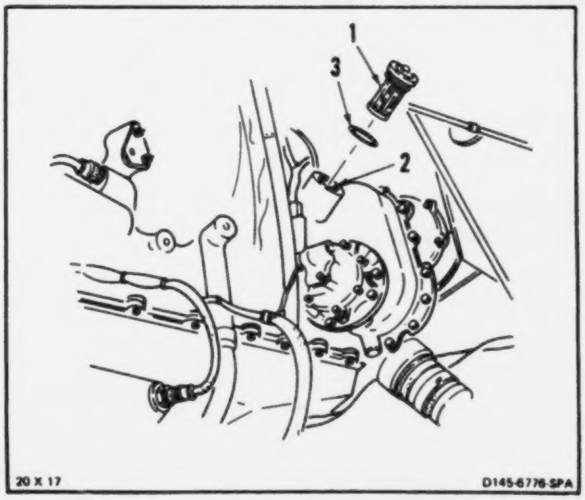
**Do not let debris enter transmission. Damage can result.**

2. **Remove screen (1)** from transmission cavity (2). Cover cavity with barrier material (E80) and tape (E388).
3. Remove packing (3) from screen (1).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**



## 6-156 INSTALL AFT TRANSMISSION MAIN INLET SCREEN 6-156

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Socket, 1-Inch
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

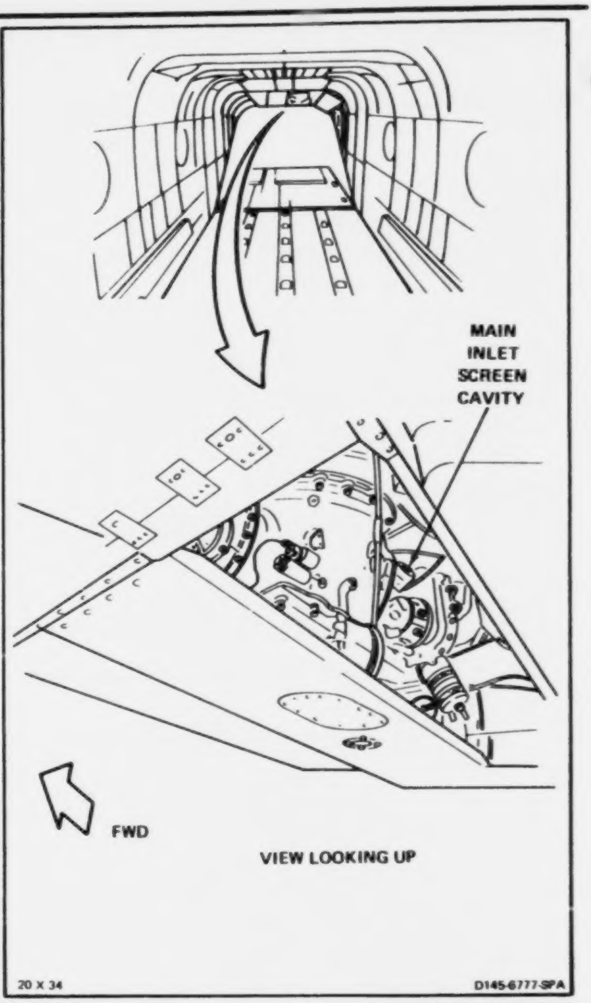
***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packing

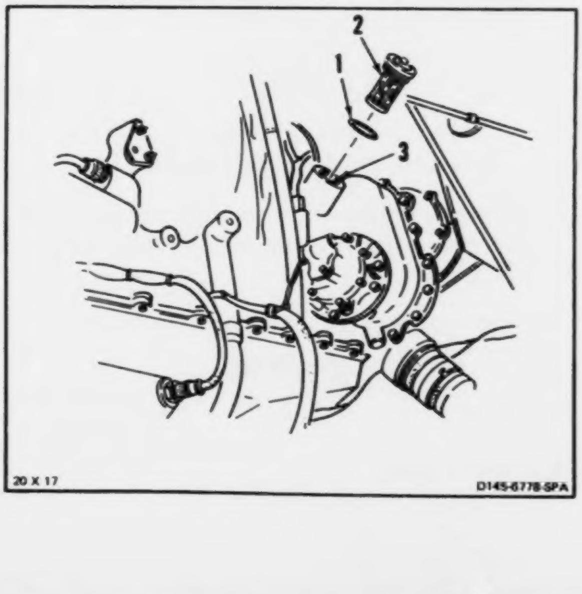
***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Aft Transmission Main Inlet Screen Inspected
(Task 6-131)


MAIN
INLET
SCREEN
CAVITY
FWD
VIEW LOOKING UP
20 X 34
D145-6777-SPA

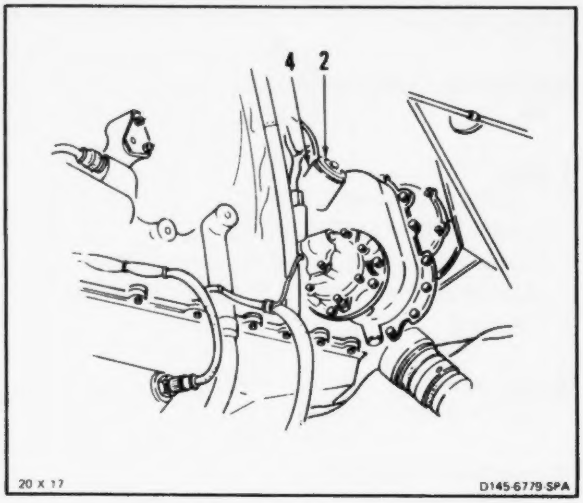
1. Coat packing (1) and thread of screen (2) with oil (E254). Install packing on screen.
2. Remove tape and barrier material from transmission cavity (3).
3. **Install screen (2)** in cavity (3). **Torque screen to 80 inch-pounds.**


2
1
3
20 X 17
D145-6778-SPA

***GO TO NEXT PAGE***

## 6-156 INSTALL AFT TRANSMISSION MAIN INLET SCREEN (Continued) 6-156

4. Lockwire screen (2) to transmission (4). Use lockwire (E231).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Close left baffle under aft transmission (Task 2-2).

**END OF TASK**

## 6-157 REMOVE AFT TRANSMISSION DEBRIS DETECTION SCREEN 6-157

INITIAL SETUP

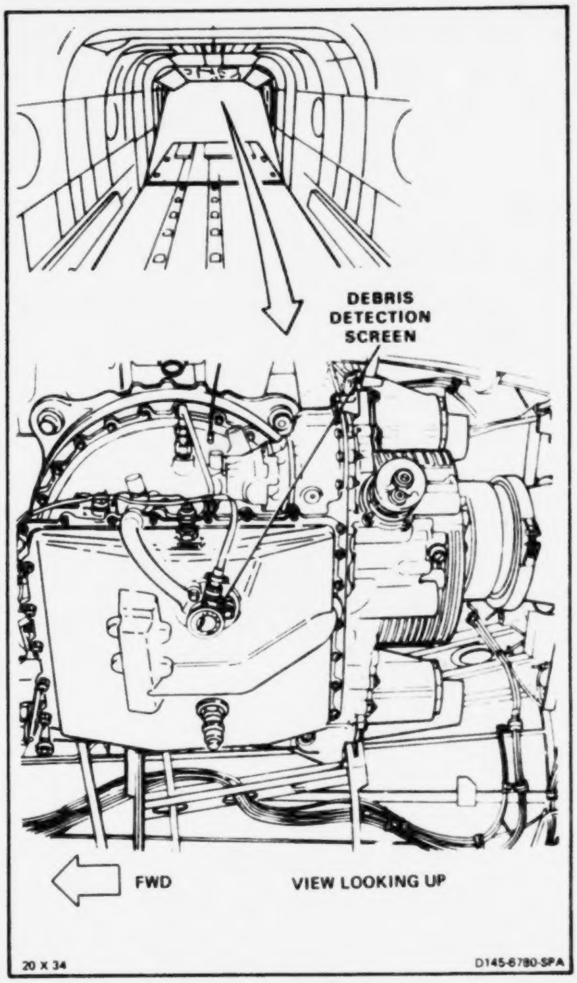
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 2-Quart (Cap Removed Only)
Container, 14 Quart (3) (Cap and Housing Removal)

***Materials:***
Cloths (E120)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Transmission Drip Tray Access Panel Removed (Cap Removal Only) (Task 2-3)
Baffles Under Transmission Open (Cap and Housing Removal) (Task 2-2)
Aft Transmission Drip Tray Removed (Cap and Housing Removal) (Task 2-3)



***REMOVE CAP***

1. **Disconnect electrical connector (1)** from cap receptacle (2).

**NOTE**

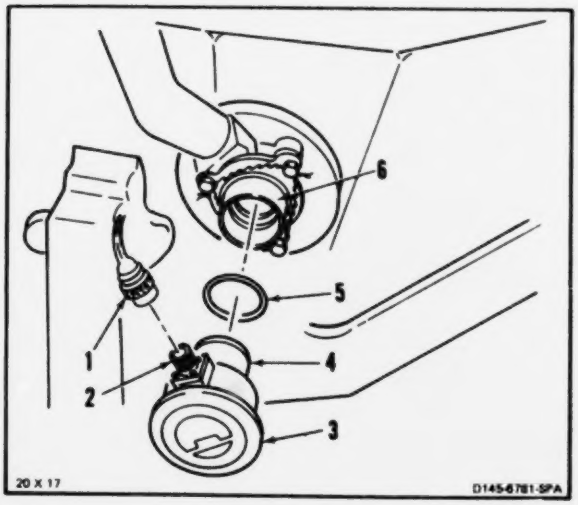
Cap holds 2 to 3 ounces of oil.

2. Hold container under cap (3). Push in center of cap and **pull down cap** to remove cap, screen (4), and packing (5). **Drain oil** into container.

**NOTE**

Screen is part of cap.

3. Filter drained oil through cloth (E120). Check cloth and screen (4) for debris. Retain debris for contamination analysis (Task 6-108).
4. If housing (6) will not be removed, go to FOLLOW-ON MAINTENANCE.



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## 6-157 REMOVE AFT TRANSMISSION DEBRIS DETECTION SCREEN (Continued) 6-157

*REMOVE HOUSING*

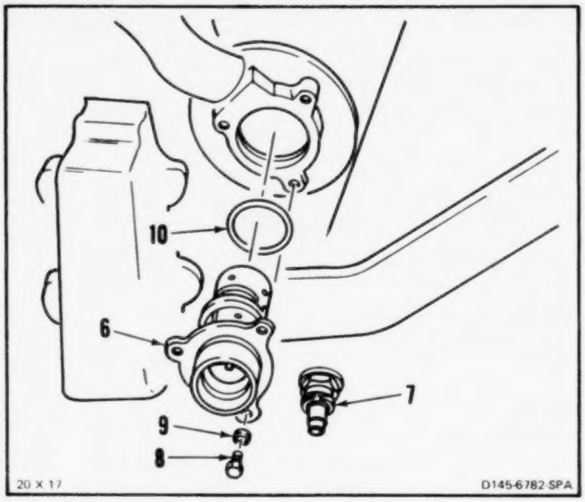
**NOTE**

Sump holds about 30 quarts of oil.

5. Push in drain valve (7), twist, and pull. **Drain oil** into container. Push in valve and twist to close.
6. Remove lockwire from three bolts (8). **Remove three bolts** and washers (9).
7. **Remove housing (6)** and packing (10).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

## 6-158 INSTALL AFT TRANSMISSION DEBRIS DETECTION SCREEN 6-158

INITIAL SETUP

***Applicable Configurations:***
All

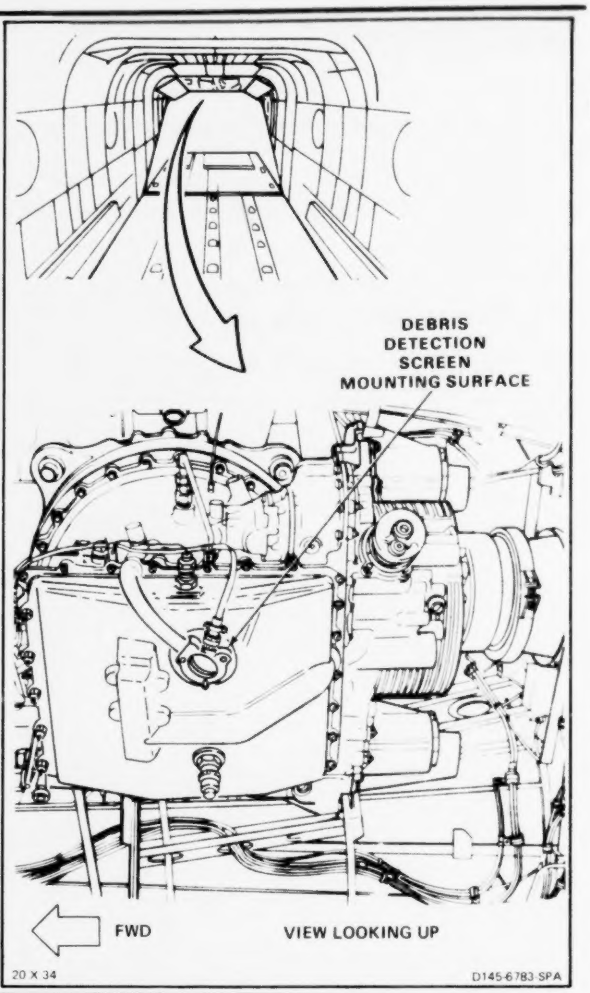
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P
TM 55-1520-240-T

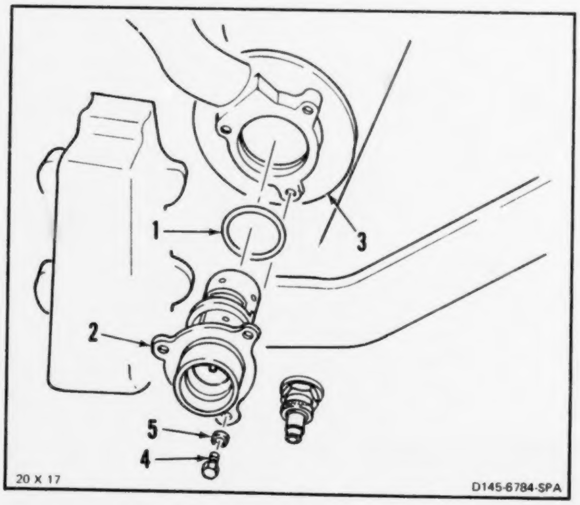

DEBRIS DETECTION SCREEN MOUNTING SURFACE
FWD
VIEW LOOKING UP
20 X 34
D145-6783-SPA

**NOTE**

If only cap is being installed, go to step 4.

***INSTALL HOUSING***

1. Install packing (1) on housing (2). **Install housing** in sump (3).
2. **Install three bolts (4)** and washers (5). **Torque bolts to 60 inch-pounds.**
3. Lockwire three bolts (4) together. Use lockwire (E231).


1
2
3
4
5
20 X 17
D145-6784-SPA

***GO TO NEXT PAGE***

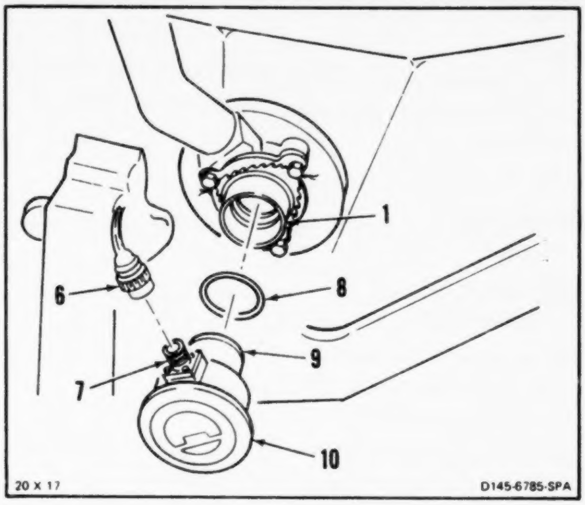
## 6-158 INSTALL AFT TRANSMISSION DEBRIS DETECTION SCREEN (Continued) 6-158

*INSTALL CAP*

**NOTE**

Screen is part of cap.

4. **Connect electrical connector (6)** to receptacle (7).
5. Perform operational check of aft transmission debris detection system (TM 55-1520-240-T).
6. Install packing (8) on screen (9).
7. Press in center of cap (10). **Install cap and screen (9)** in housing (1).



*INSPECT*

FOLLOW-ON MAINTENANCE:

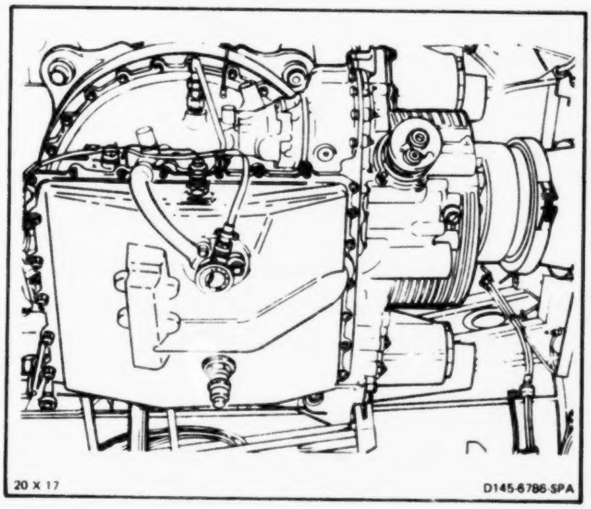
Service aft transmission (Task 1-54).

Install aft transmission drip tray access cover (cap only installed) (Task 2-3).

Install aft transmission drip tray (cap and housing installed) (Task 2-3).

Close baffles under aft transmission (cap and housing installed) (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).



END OF TASK

## 6-158.1 REMOVE GENERATOR OIL OUTLET SCREENS 6-158.1

INITIAL SETUP

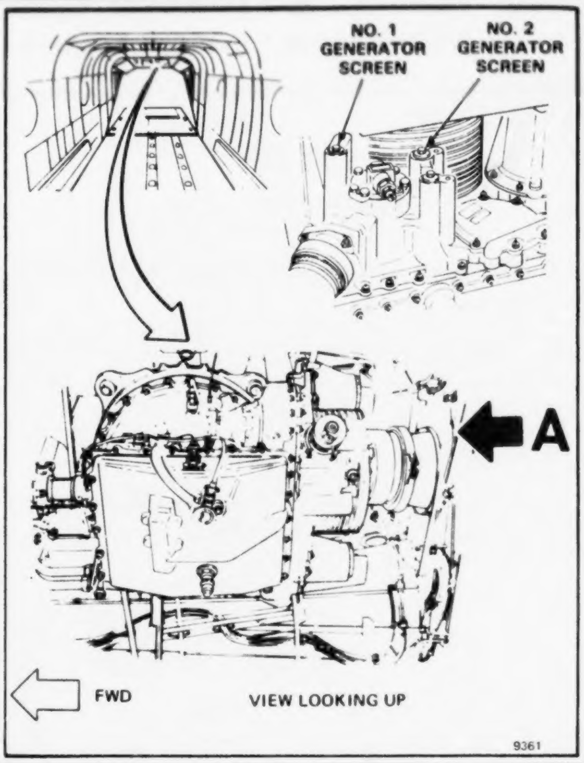
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand
Container, Two-Quart

***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Baffles Under Aft Transmission Open (Task 2-2)
Aft Transmission Drip Tray Removed (Task 2-3)
Cargo Ramp Open and Level (TM 55-1520-240-T)



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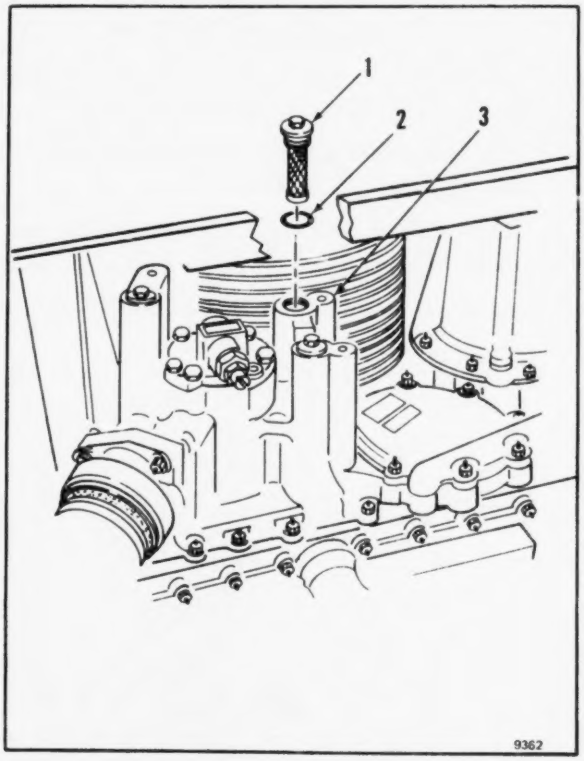
**NOTE**

Procedure is same to remove No. 1 or No. 2 generator oil outlet screen. No. 2 generator screen shown here.

1. **Remove lockwire** from screen (1).
2. **Remove screen (1)** and packing (2) from transmission (3). Catch spilled oil in container.

FOLLOW-ON MAINTENANCE:

If screen was removed following generator failure, inspect screen (Task 6-158.2).



**END OF TASK**

## 6-158.2 INSPECT GENERATOR OIL OUTLET SCREENS 6-158.2

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
Brush (E86)

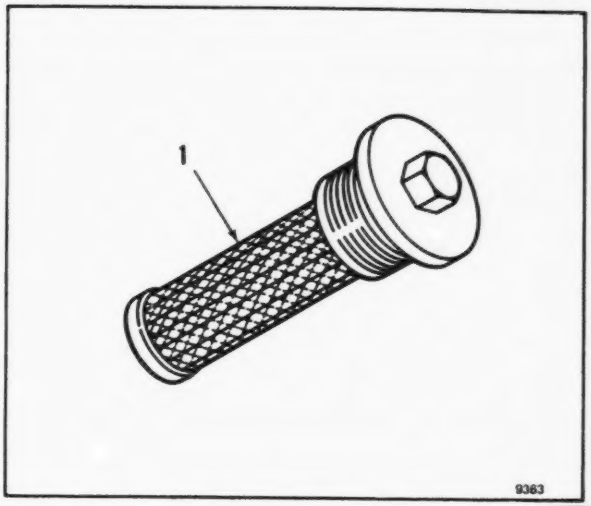
***Personnel Required:***
Medium Helicopter Repairer

***References:***
Task 6-108

***Equipment Condition:***
Off Helicopter Task

---

1. **Check screen (1) for bits of metal** and other debris. Retain all debris for contamination analysis (Task 6-108). If debris is found, reject screen.
2. **Inspect screen (1) for tears.** There shall be no tears.



FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-158.3 INSTALL GENERATOR OIL OUTLET SCREENS 6-158.3

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***

Oil (E254)
Lockwire (E232)

***Parts:***

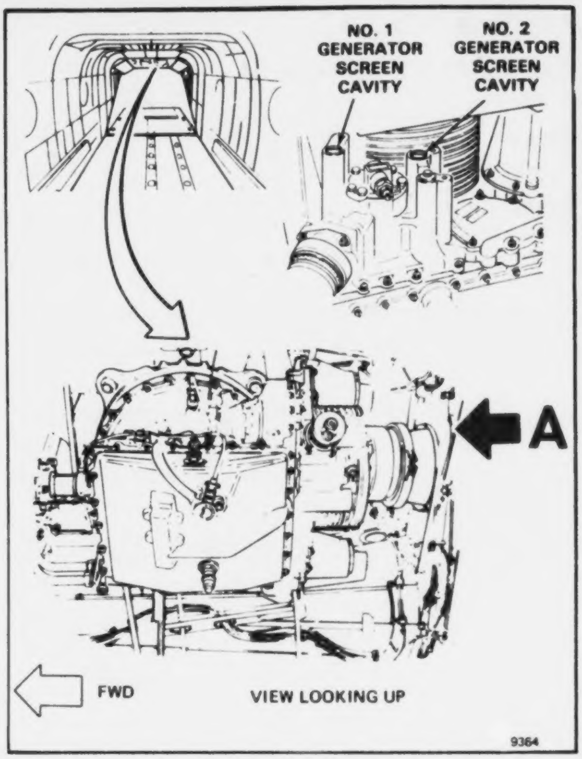
Packing

***Personnel Required:***

Medium Helicopter Repairer
Inspector

***References:***

TM 55-1520-240-23P


NO. 1 GENERATOR SCREEN CAVITY
NO. 2 GENERATOR SCREEN CAVITY
A
FWD
VIEW LOOKING UP
9364

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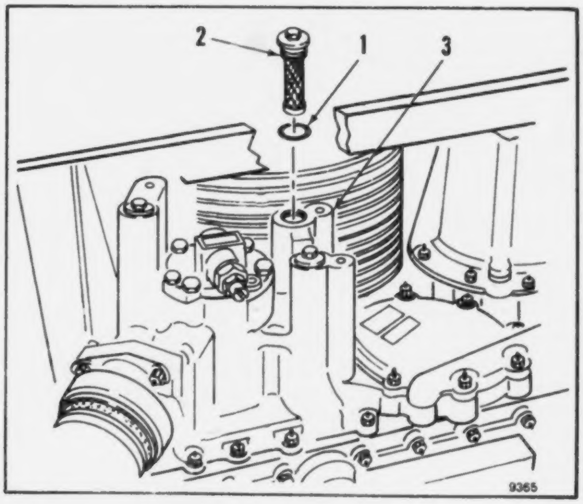
**NOTE**

Procedure is same to install No. 1 or No. 2 generator oil outlet screen. No. 2 generator screen shown here.

1. **Coat** packing (1) and thread of screen (2) **with oil (E254).**
2. **Install packing (1)** on screen (2). **Install screen** in transmission (3). **Torque screen** to 80 inch-pounds.



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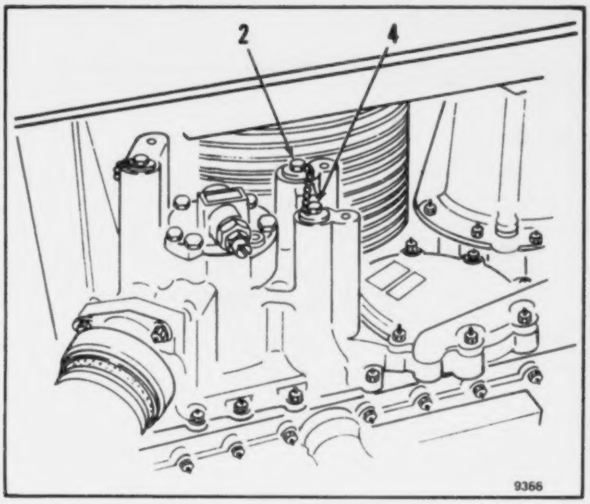
## 6-158.3 INSTALL GENERATOR OIL OUTLET SCREENS (Continued) 6-158.3

3. **Lockwire screen (2)** to spare screen housing (4).



FOLLOW-ON MAINTENANCE:

Service aft transmission with oil (Task 1-54).

Install aft transmission drip tray (Task 2-3).

Close baffles under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-23P).

**END OF TASK**

## 6-159 REPLACE AFT TRANSMISSION SIGHT GAGE 6-159

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 14-Quart
Spanner Wrench
Torque Wrench, 30 to 150 Inch-Pounds

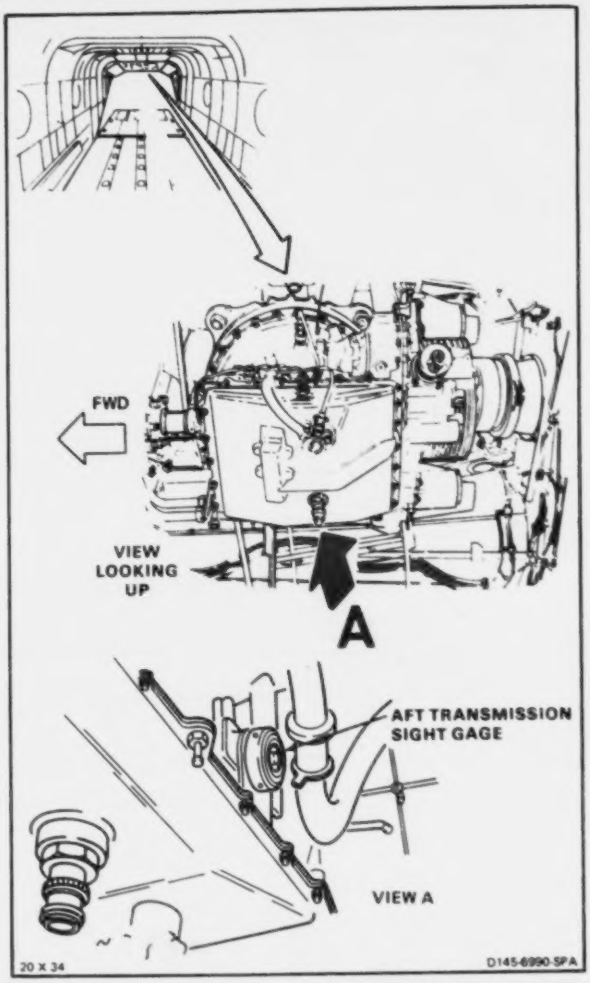
***Materials:***
Lockwire (E231)
Oil (E254)

***Parts:***
Packing

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)
Right Baffle Under Aft Transmission Open (Task 2-2)



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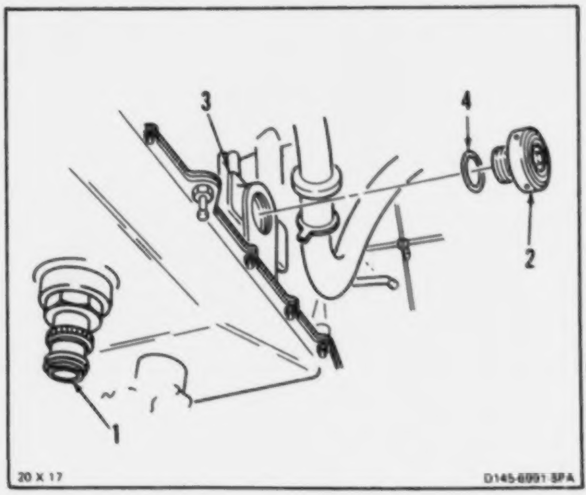
***REMOVE SIGHT GAGE***

1. Position container under sump drain valve (1).
2. Push in drain valve (1), twist and pull. **Drain oil** into container until oil level is below sight gage (2).
3. Close valve (1) by pushing it in and twisting it.
4. Remove lockwire from sight gage (2). **Remove gage** from transmission (3). Use spanner wrench.
5. Remove packing (4) from sight gage (2).



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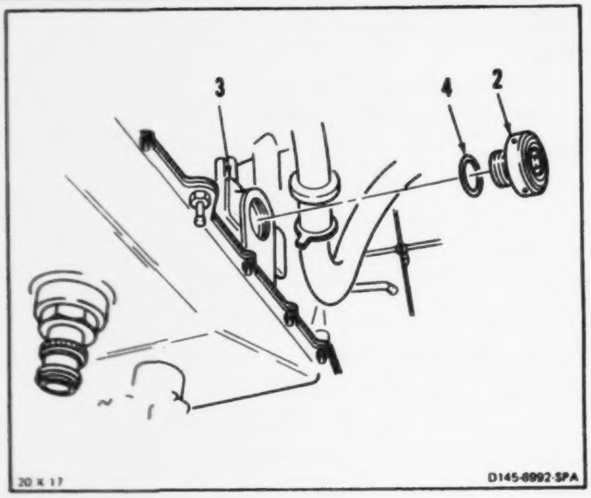
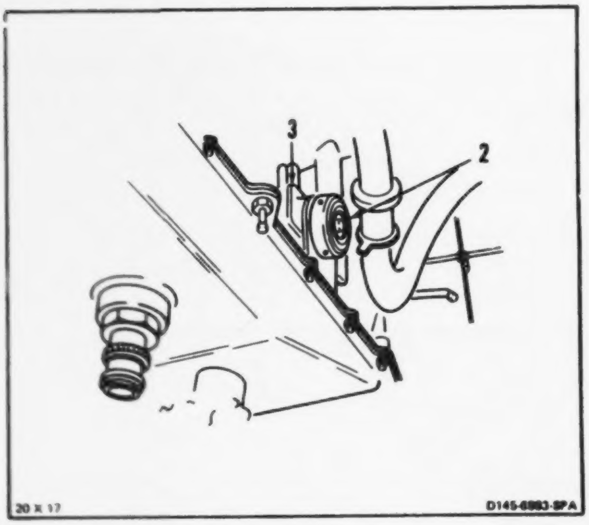
## 6-159 REPLACE AFT TRANSMISSION SIGHT GAGE (Continued) 6-159

***INSTALL SIGHT GAGE***

6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. **Install sight gage (2)** in transmission (3). Use spanner wrench. **Torque gage to 80 inch-pounds.**



8. Lockwire gage (2) to transmission (3). Use lockwire (E231).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Service aft transmission (Task 1-54).

Close right baffle under aft transmission (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-160 INSPECT AFT ROTOR SHAFT CHIP DETECTOR PLUG 6-160

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-232-4692

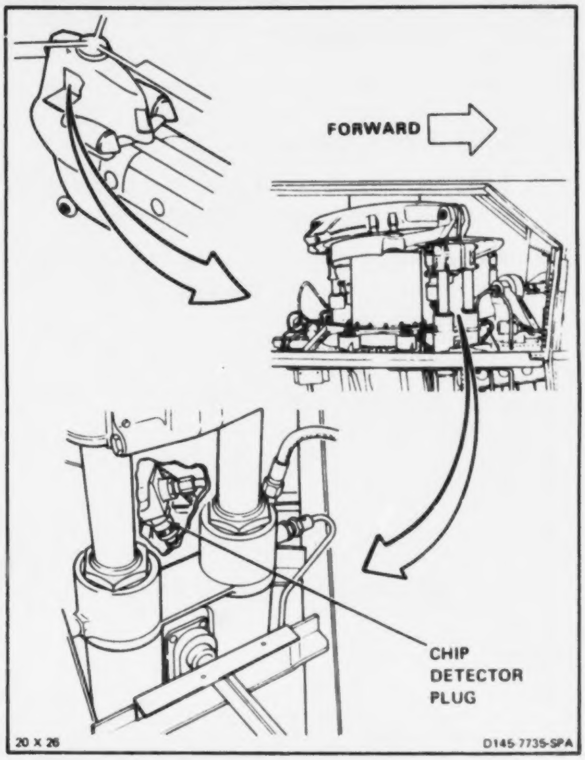
***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

***Parts:***
Packing

***Personnel Required:***
Medium Helicopter Repairer
Inspector

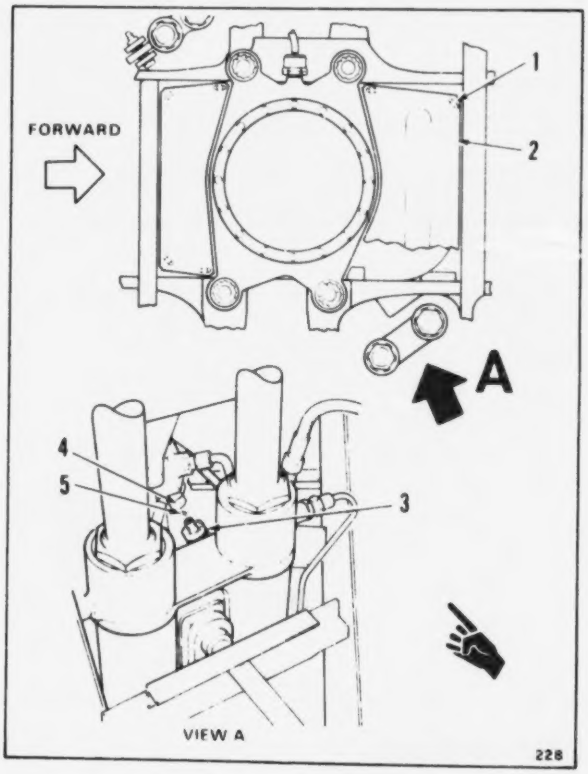
***References:***
TM 55-1520-240-23P
TM 55-1520-240-T
Task 6-108

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Right Work Platform Open (Task 2-2)



***REMOVE PLUG***

1. Loosen four turnlock fasteners (1) on access panel (2). **Remove panel.**
2. Push in chip detector plug (3) and turn it counterclockwise. **Remove plug** from chip detector body (4).
3. **Remove packing (5)** from plug (3).



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## 6-160 INSPECT AFT ROTOR SHAFT CHIP DETECTOR PLUG (Continued) 6-160

### *INSPECT PLUG*

**NOTE**

Some metal fuzz on tip of plug is normal.

4. **Check tip (6) of plug (3) for chips.** Save chips for contamination analysis (Task 6-108).

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.**

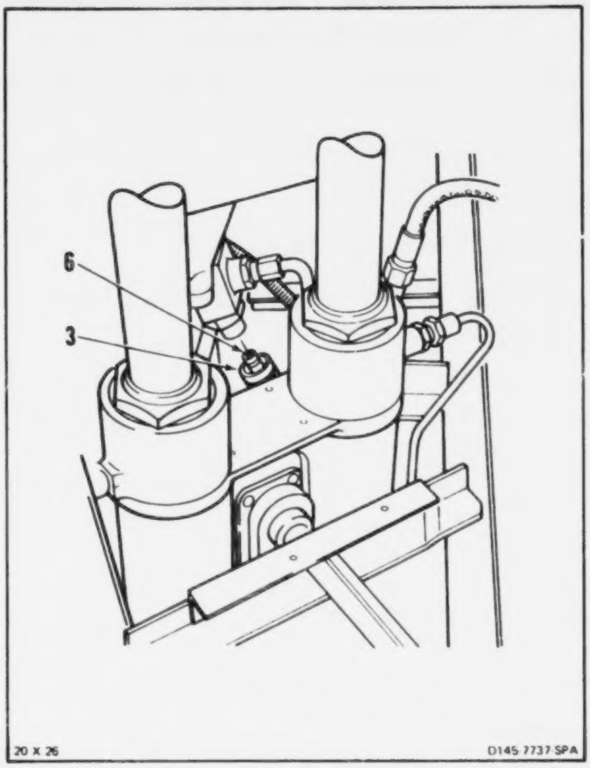
5. **Clean tip (6)** with dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186). Dry tip.
6. **Perform operational check** of plug (3) (TM 55-1520-240-T).

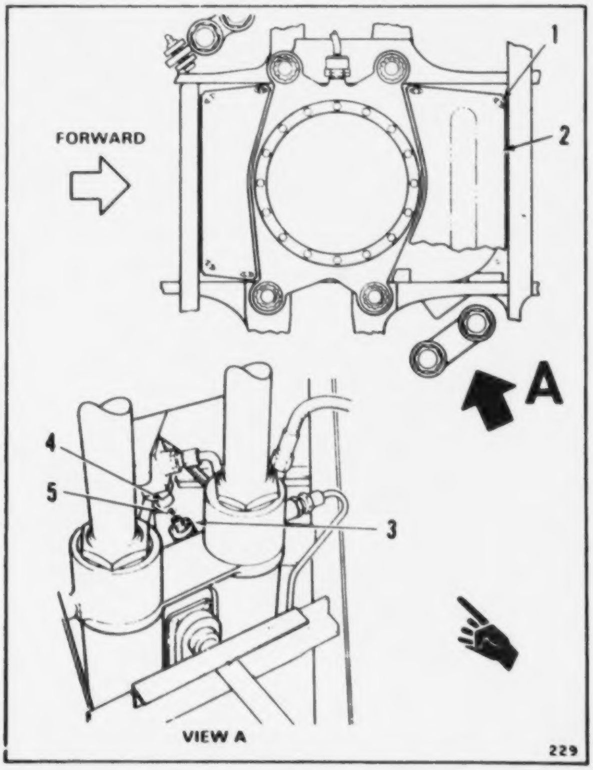
### *INSTALL PLUG*

7. **Install packing (5)** on plug (3).
8. **Install plug (3)** in chip detector body (4). Push in and turn plug clockwise to lock it.

### *INSPECT*

9. **Install access panel (2).** Tighten four turn-lock fasteners (1).





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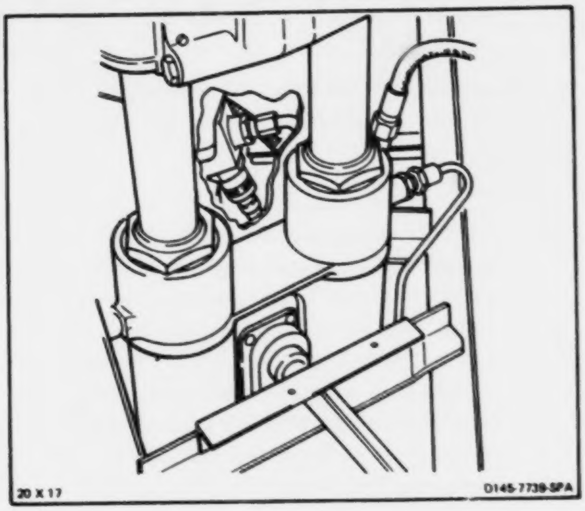
## 6-160 INSPECT AFT ROTOR SHAFT CHIP DETECTOR PLUG (Continued) 6-160


20 X 17
D145-7739-SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close aft pylon right work platform (Task 2-2).

**END OF TASK**

## 6-161 REMOVE AFT ROTOR SHAFT CHIP DETECTOR 6-161

INITIAL SETUP

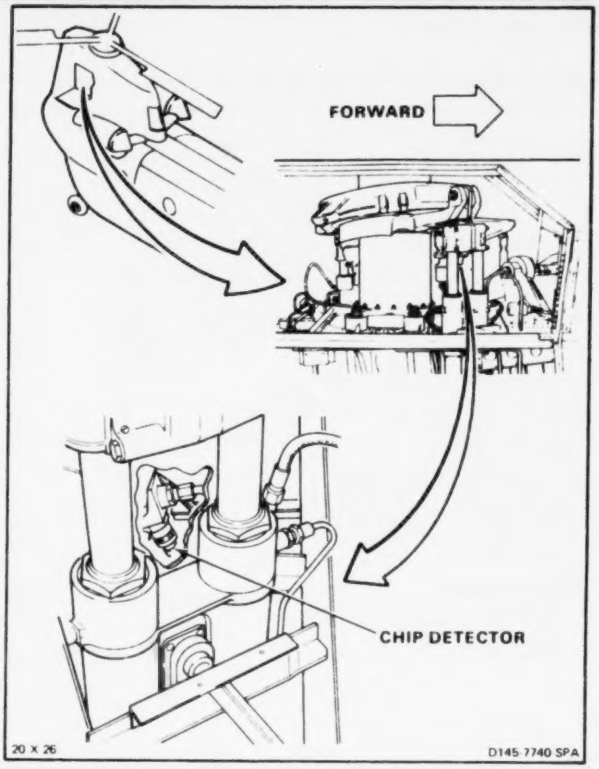
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/4-Inch

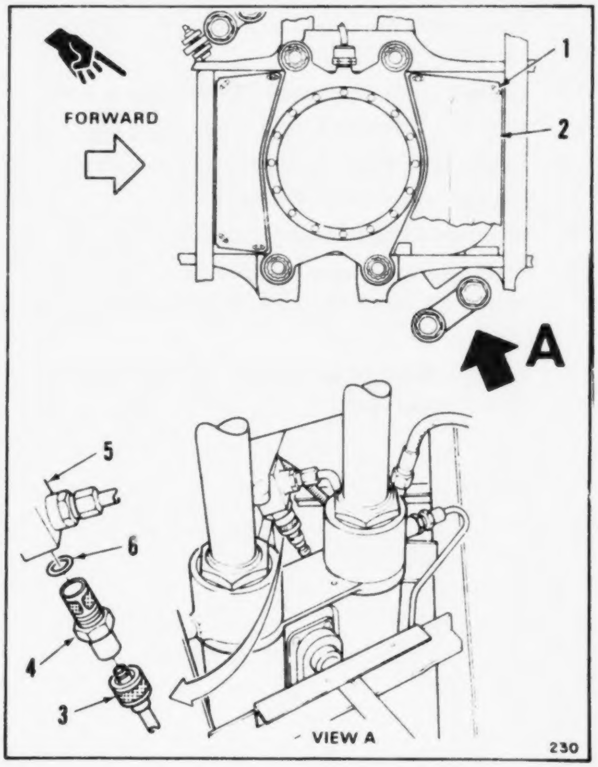
***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Right Work Platform Open (Task 2-2)



1. Loosen four turnlock fasteners (1) on access panel (2). **Remove panel.**
2. **Disconnect electrical connector (3).**
3. Remove lockwire from body of chip detector (4). **Remove chip detector** from bearing support (5).
4. Remove packing (6) from chip detector (4).



FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-162 INSTALL AFT ROTOR SHAFT CHIP DETECTOR 6-162

INITIAL SETUP

***Applicable Configurations:***
All

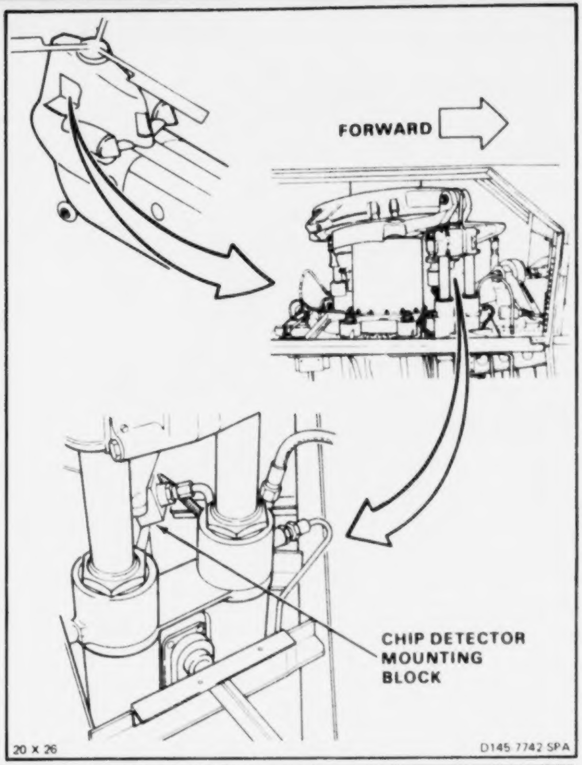
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Crowfoot Attachment, 1 1/4-Inch
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Oil (E254)
Lockwire (E231)

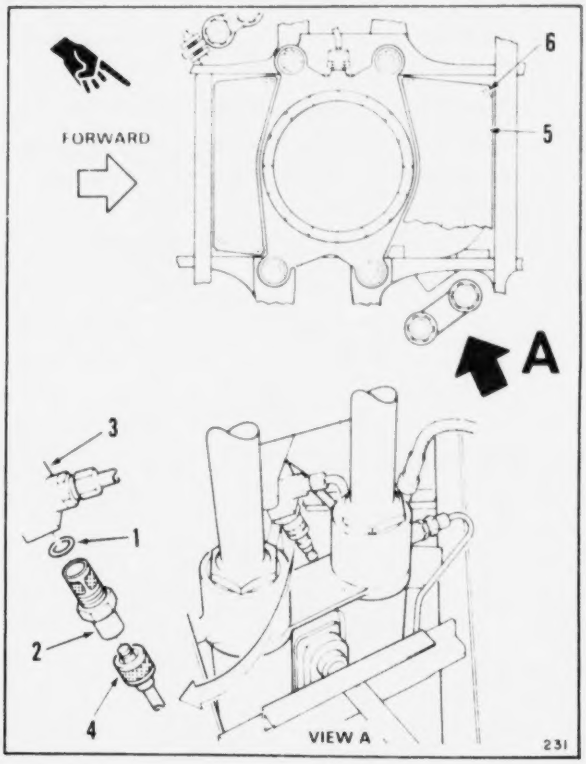
***Parts:***
Packings

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P
TM 55-1520-240-T



1. Coat packing (1) and thread of chip detector (2) with oil (E254).
2. **Install chip detector (2)** in bearing support (3). **Torque to 80 inch-pounds.**
3. **Lockwire chip detector (2)** to bearing support (3). Use lockwire (E231).
4. **Connect electrical connector (4).**
5. **Perform operational check** of aft rotor shaft chip detector plug. (Refer to TM 55-1520-240-T.)
6. **Install access panel (5).** Tighten four turnlock fasteners (6).



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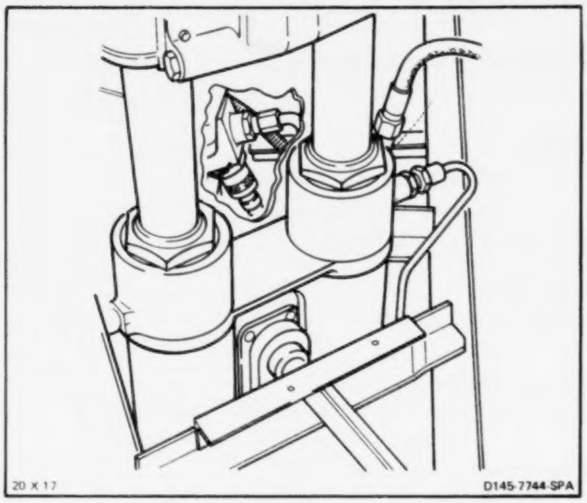
## 6-162 INSTALL AFT ROTOR SHAFT CHIP DETECTOR (Continued) 6-162

*INSPECT*

FOLLOW-ON MAINTENANCE:

Close aft pylon right work platform (Task 2-2).


20 X 17
D145-7744-SPA

**END OF TASK**

## 6-163 REMOVE AFT ROTOR SHAFT OIL FILTER 6-163

INITIAL SETUP

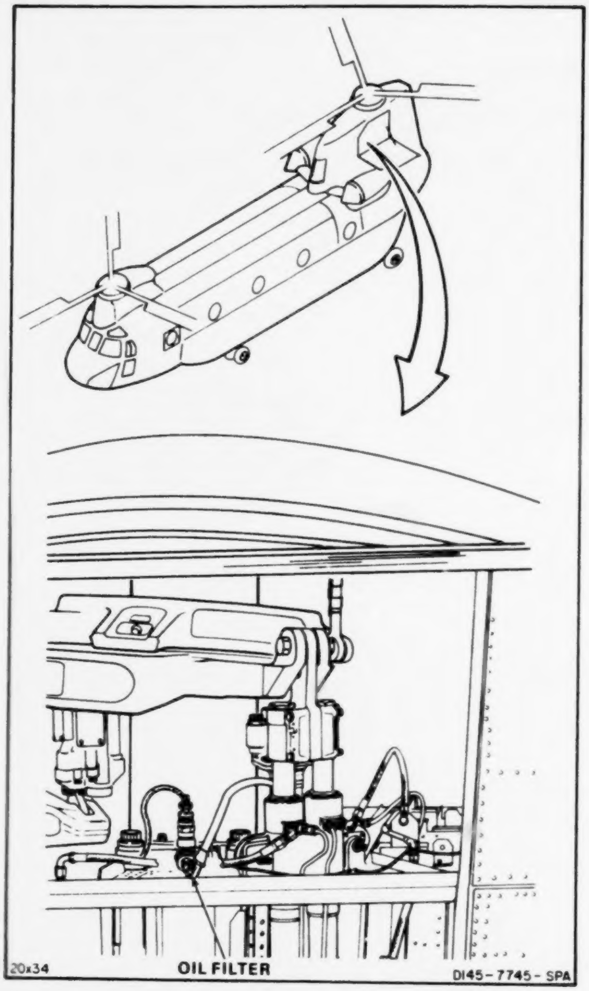
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wrench, 1 3/4-Inch

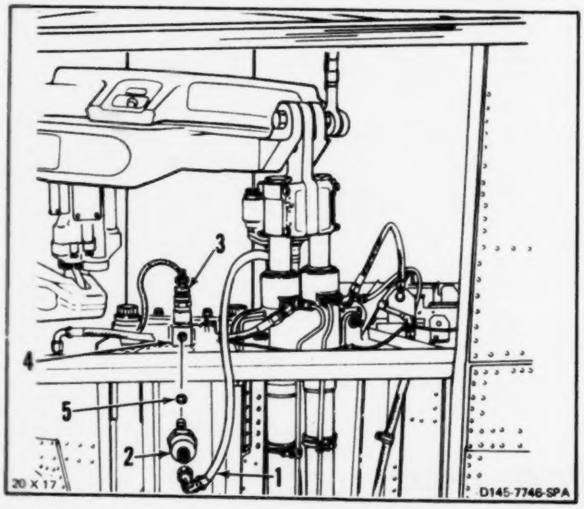
***Materials:***
Cloths (E120)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Left Work Platform Open (Task 2-2)



1. **Disconnect oil hose (1)** from oil filter (2). Use cloths (E120) to absorb spillage.
2. Remove lockwire from between oil filter (2) and oil pressure switch (3). **Remove filter** from bearing support (4).
3. Remove packing (5) from filter (2).



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

# 6-164 CLEAN AND INSPECT AFT ROTOR SHAFT OIL FILTER 6-164

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wrench, 1 3/4-Inch (2)
Source of Low-Pressure Compressed Air

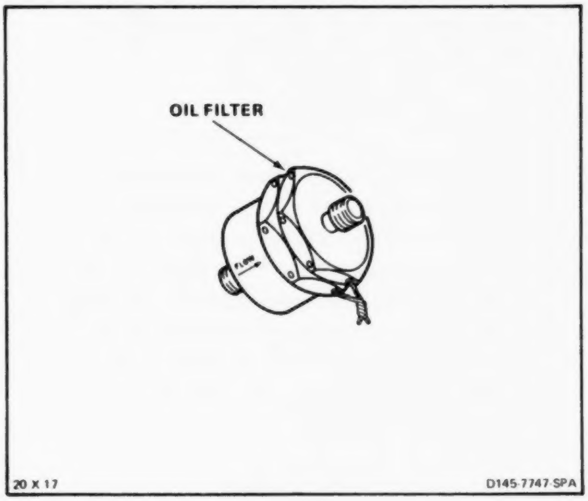
***Materials:***
Dry Cleaning Solvent (E162)
Brush (E86)
Gloves (E186)
Lockwire (E231)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Off Helicopter Task



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## 6-164 CLEAN AND INSPECT AFT ROTOR SHAFT OIL FILTER (Continued) 6-164

1. Remove lockwire. **Remove housing (1) from plug (2). Remove packing (3)** from plug.
2. **Remove strainer element (4)** from housing (1).
3. **Check strainer element (4)** for metal particles. Save particles for contamination analysis (Task 6-108).

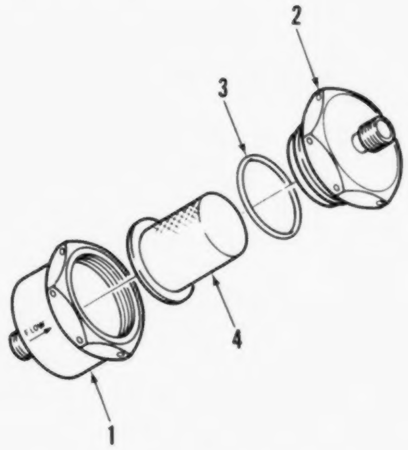
**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Do not use more than 30 psi compressed air for cleaning purposes. Debris propelled under pressure can cause injury to eyes. Use source of compressed air under 30 psi and eye protection to prevent injury to personnel.**

4. **Clean housing (1), plug (2), and strainer element (4).** Use dry cleaning solvent (E162) and brush (E86). Dry with low-pressure compressed air. Wear gloves (E186).
5. **Inspect** housing (1), plug (2), and strainer (4) for damage. There shall be no damage.
6. Install packing (3) on plug (2).
7. **Install strainer element (4)** in housing (1). **Install housing on plug (2).**



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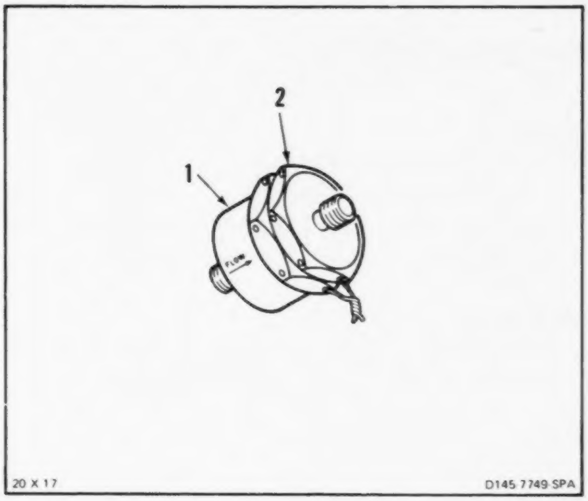
## 6-164 CLEAN AND INSPECT AFT ROTOR SHAFT OIL FILTER (Continued) 6-164

8. Lockwire housing (1) to plug (2). Use lockwire (E231).


2
1
FLOW
20 X 17
D145-7749-SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-165 INSTALL AFT ROTOR SHAFT OIL FILTER 6-165

INITIAL SETUP

***Applicable Configurations:***
All

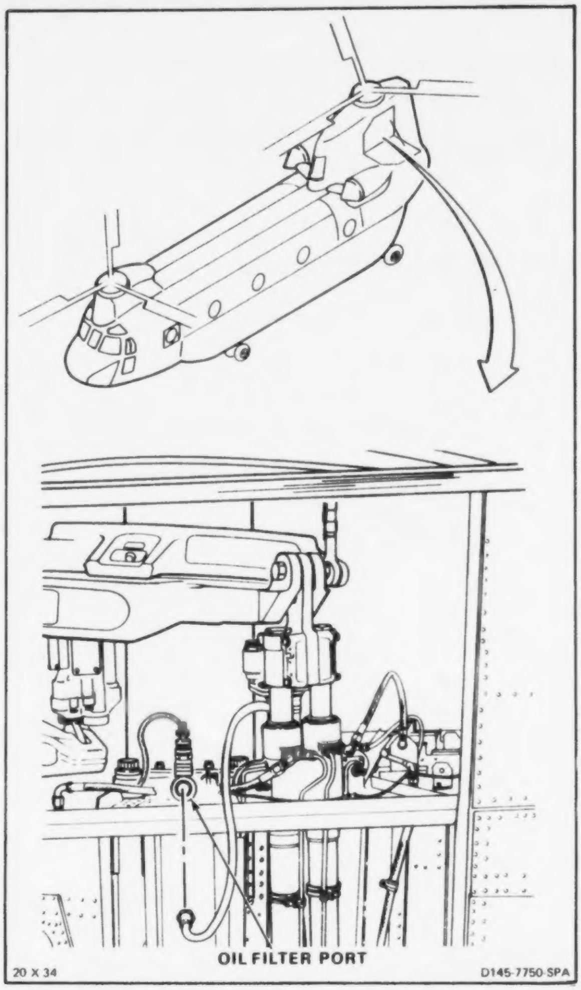
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Crowfoot Attachment, 1 3/4-Inch
Torque Wrench, 5 to 50 Inch-Pounds

***Materials:***
Oil (E254)
Lockwire (E231)

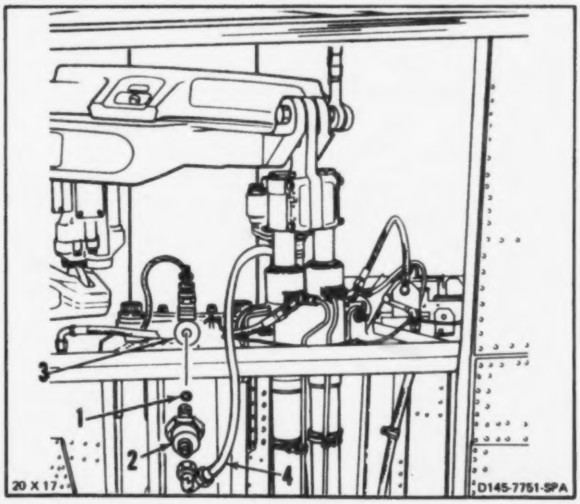
***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P



1. Coat packing (1) and thread of oil filter (2) with oil (E254).
2. **Install filter (2)** in bearing support (3). **Torque filter to 20 inch-pounds.**
3. **Connect oil hose (4)** to filter (2).



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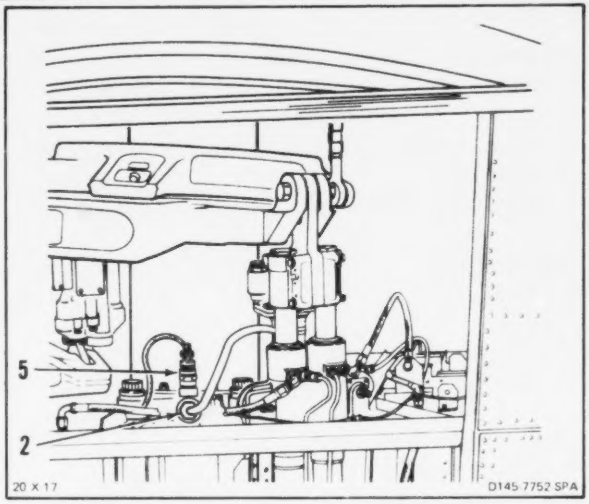
## 6-165 INSTALL AFT ROTOR SHAFT OIL FILTER (Continued) 6-165

4. **Lockwire oil filter (2)** to oil pressure switch (5). Use lockwire (E231).

*INSPECT*



FOLLOW-ON MAINTENANCE:

Close aft pylon right work platform (Task 2-2).

**END OF TASK**

## 6-166 CONTAMINATION ANALYSIS OF COMBINING TRANSMISSION OIL 6-166

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Magnet
Magnifying Glass, 12-Power

***Materials:***
None

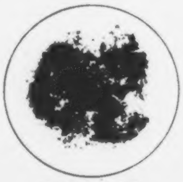
***Personnel Required:***
67U30 Inspector

***Equipment Condition:***
Off Helicopter Task

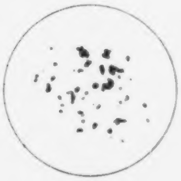
1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
   a. Separate steel particles. Use a magnet.
   b. Identify and separate remaining particles by visual inspection.
   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

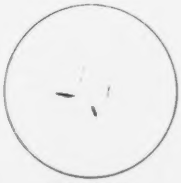
FOLLOW-ON MAINTENANCE:
None

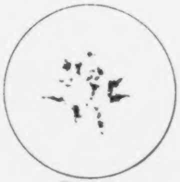
| MATERIAL | DESCRIPTION | ACTION REQUIRED |
|---|---|---|
| Steel | Fine, hair-like fuzz particles | Normal wear. No action required |
| | Limited amount of splinters, flakes, or or granular particles | Possible failure. Perform serviceability check (Task 6-170) |
| | Thin flakes up to 1/16-inch in diameter and 1/4-inch long, maximum of 10 flakes | Perform serviceability check (Task 6-170) |
| | Massive amount of splinters, flakes, or granular particles | Failure. Replace transmission (Task 6-72 and 6-77) |
| Aluminum or magnesium | Granular particles | Perform serviceability check (Task 6-170) |
| Copper, bronze, or silver | Limited amount of granular particles | Possible indication of bearing cage wear. Perform serviceability check (Task 6-170) |
| | Massive amount of granular particles or chip particles | Failure. Replace transmission (Task 6-72 and 6-77) |
| Fiberglass | Granular or fibrous particles | Perform serviceability check (Task 6-170) |



GRANULAR PARTICLES


CHIP PARTICLES


SPLINTER PARTICLES


FLAKE PARTICLES

**END OF TASK**

## 6-167 COMBINING TRANSMISSION OIL SYSTEM ALLOWABLE LEAKAGE 6-167

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter On Level Surface
Pylon Access Doors Open (Task 2-2)

**WARNING**

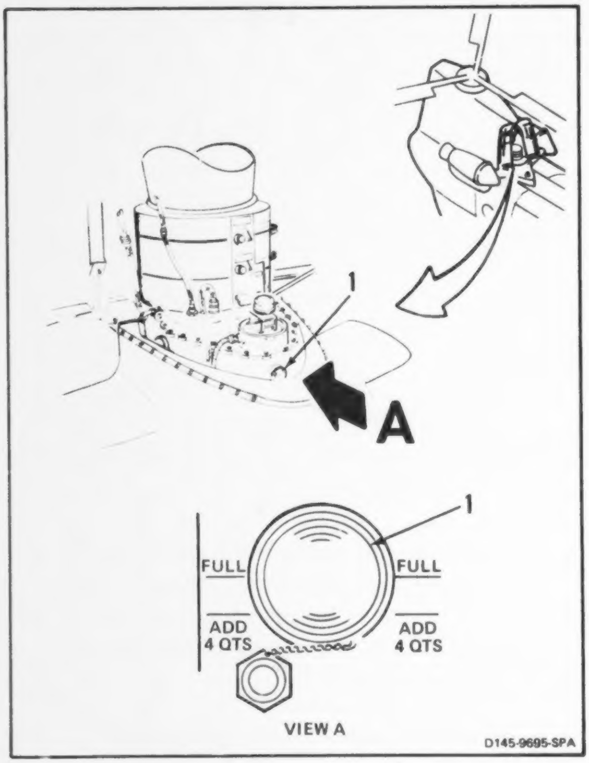
**Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.**

**CAUTION**

**The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is 20 drops (one cubic centimeter) per hour. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.**

**NOTE**

If engines have not been operated within the past 30 minutes, perform a 5-minute ground run (TM 55-1520-240-10).



**Check sight gage (1)** to determine oil level. **Oil level shall be between the FULL and ADD 4 QTS lines after a 2 hour flight.**

FOLLOW-ON MAINTENANCE:

Service combining transmission.

Close pylon access door (Task 2-2).

**END OF TASK**

## 6-168 DRAIN COMBINING TRANSMISSION OIL 6-168

INITIAL SETUP

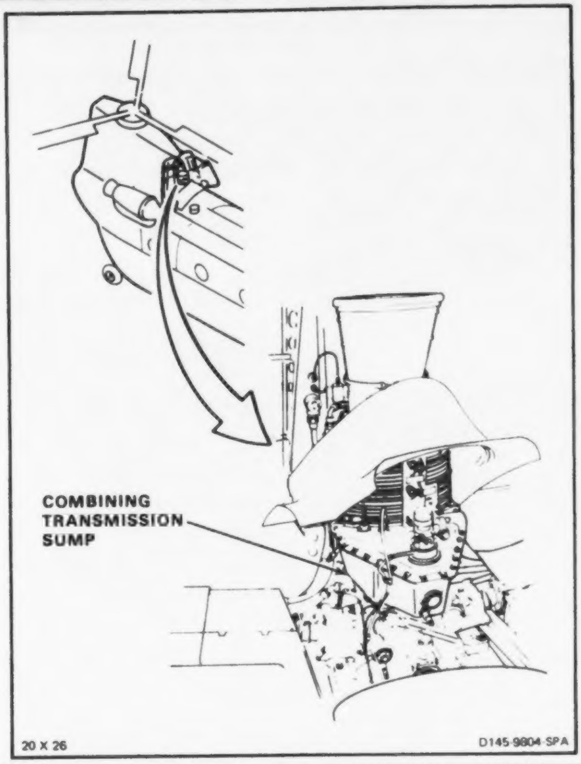
***Applicable Configurations:***
All

***Tools:***
Container, 14-Quart (2)
Hose, 1-Inch ID, 36 Inches Long
Workstand

***Materials:***
None

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)


COMBINING TRANSMISSION SUMP
20 X 26
D145-9804-SPA

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**NOTE**

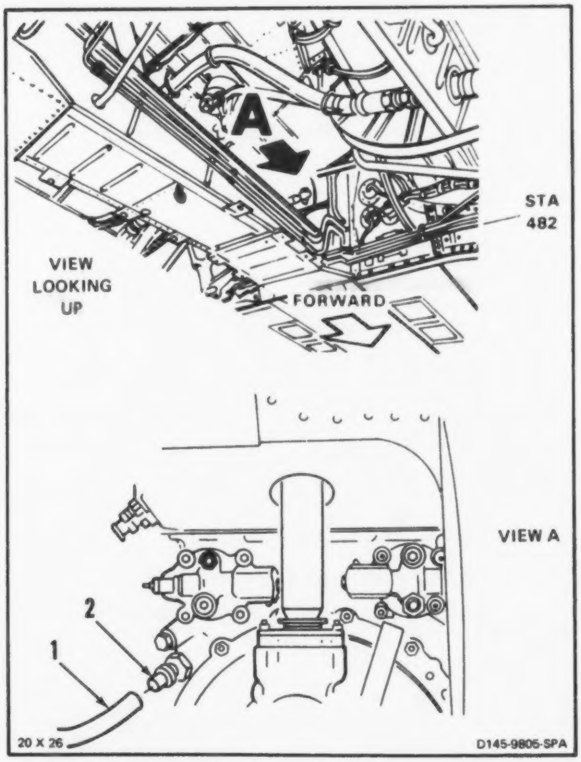
Combining transmission sump is divided into three compartments. One is for the combining transmission. The other two are for each engine transmission.

***DRAIN COMBINING TRANSMISSION COMPARTMENT***

**NOTE**

Combining transmission compartment holds about 22 quarts of oil.

1. From inside cabin, **connect hose (1)** to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
3. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.


A
STA 482
VIEW LOOKING UP
FORWARD
VIEW A
2
1
20 X 26
D145-9805-SPA

***GO TO NEXT PAGE***

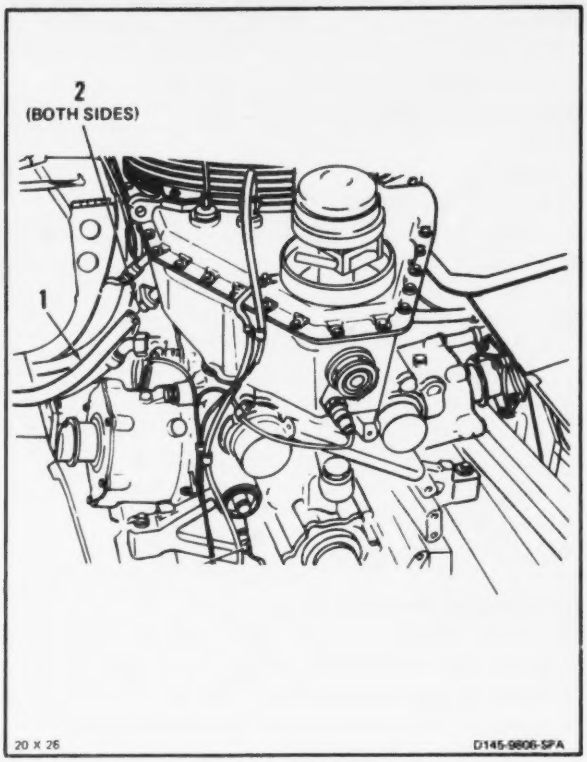
## 6-168 DRAIN COMBINING TRANSMISSION OIL (Continued) 6-168

### *DRAIN ENGINE TRANSMISSION COMPARTMENT*

**NOTE**

- Drain either engine transmission compartment in same way. Right compartment shown.
- Each compartment holds about 7 quarts of oil.

4. **Connect hose (1)** to drain valve (2). Direct end of hose into container.
5. Push in drain valve (2), twist it, and pull. **Let oil drain** into container.
6. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.



FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).
Close pylon access doors (Task 2-2).

**END OF TASK**

## 6-169 FLUSH COMBINING TRANSMISSION OIL SYSTEM 6-169

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

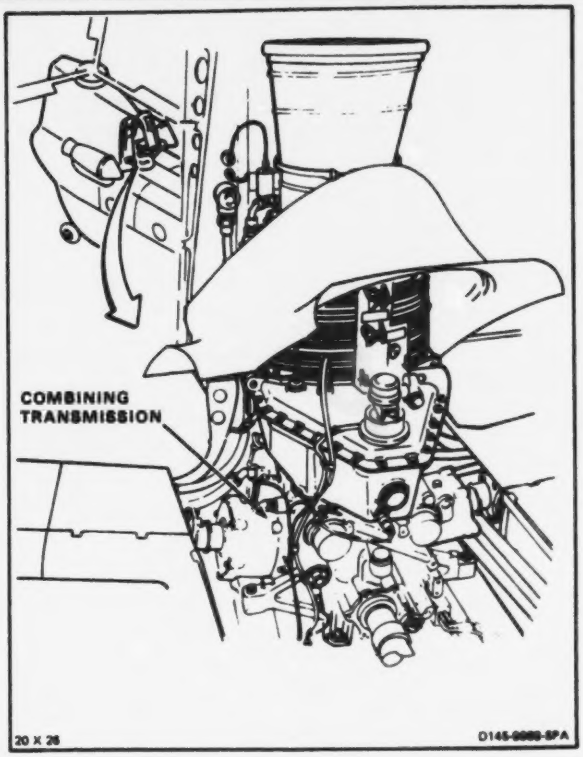
***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

***References:***

| | |
|---|---|
| Task 1-54 | Task 6-175 |
| Task 6-168 | Task 6-176 |
| Task 6-171 | Task 6-178 |
| Task 6-173 | Task 6-180 |
| Task 6-174 | Task 6-181 |

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)



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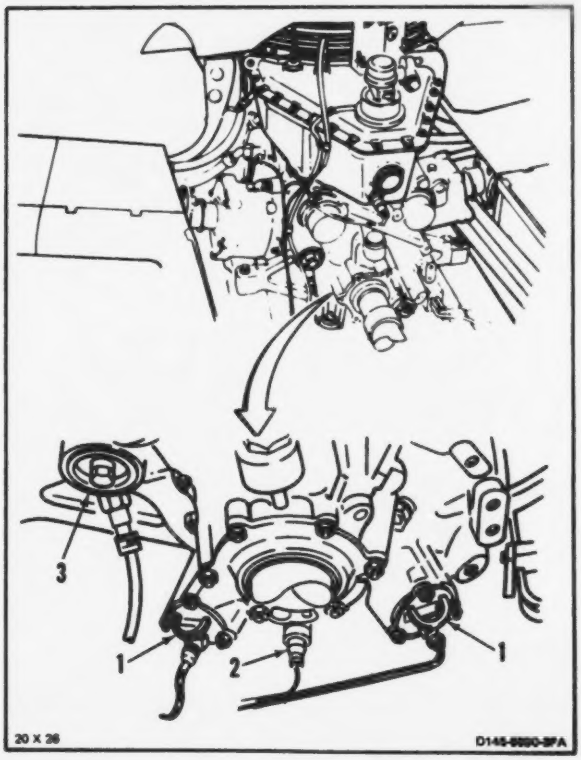
1. **Drain oil** from combining transmission (Task 6-168).
2. Remove, inspect, and **clean two debris detection screens (1)** (Task 6-174 and 6-175). Install screens (Task 6-176).
3. **Inspect chip detector (2)** (Task 6-178).
4. **Replace auxiliary oil filter (3)** (Task 6-173).



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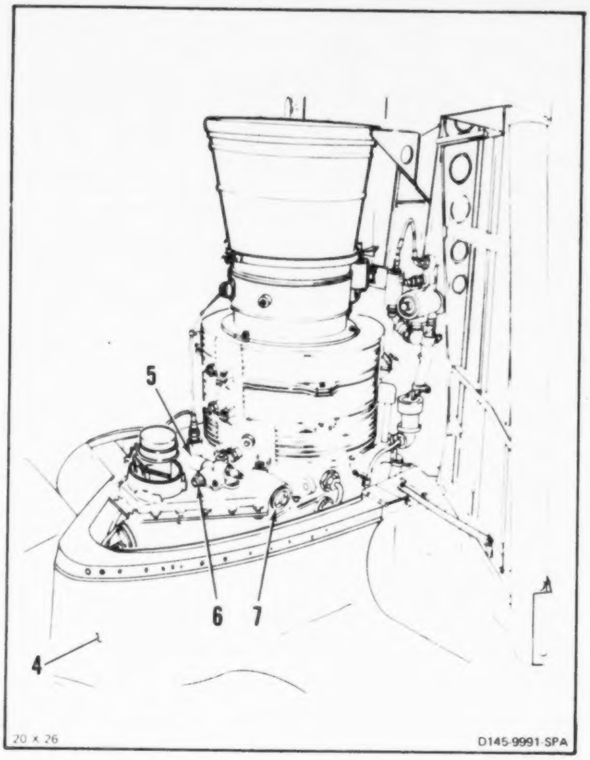
## 6-169 FLUSH COMBINING TRANSMISSION OIL SYSTEM (Continued) 6-169

5. Close pylon lower fairing (4) (Task 2-2).
6. **Replace main oil filter element (5)** (Task 6-171). Note position of indicator button (6).
7. If indicator button (6) was extended, **replace inlet screen (7)** (Task 6-180 and 6-181).
8. **Service combining transmission** with oil (Task 1-54).
9. Have pilot **perform ground run** (TM 55-1520-240-10). When combining transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
10. **Repeat steps 1 thru 8.**



FOLLOW-ON MAINTENANCE:

Close pylon access doors (Task 2-2).

**END OF TASK**

## 6-170 COMBINING TRANSMISSION SERVICEABILITY CHECK 6-170

INITIAL SETUP

***Applicable Configurations:***
All

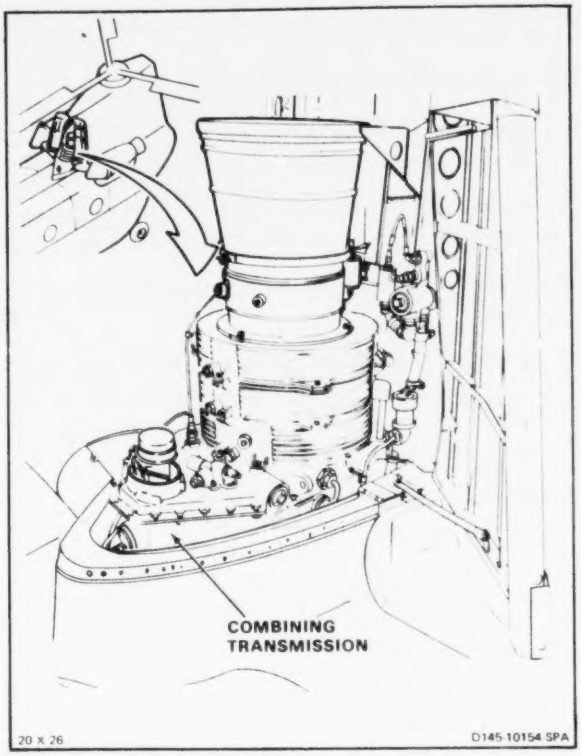
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Cheesecloth (E112)

***Personnel Required:***
67U20 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

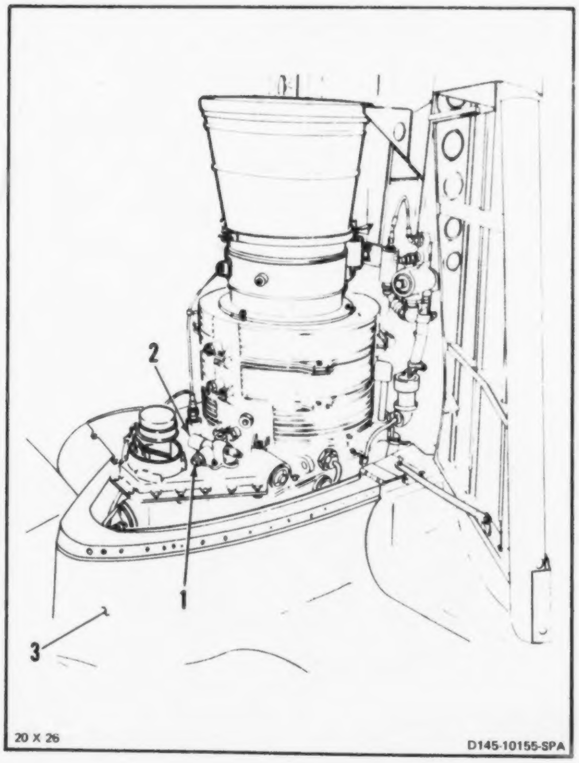
***References:***
Task 6-168
Task 6-169
Task 6-171
Task 6-173
Task 6-174
Task 6-175
Task 6-176
Task 6-178
Task 6-72
Task 6-77
TM 55-1520-240-10
Task 2-2

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)



---

1. **Flush combining transmission** (Task 6-169).
2. Have pilot **perform ground run** for 1 hour at normal rotor rpm (TM 55-1520-240-10). If combining transmission oil temperature or pressure changes abnormally during operation, have pilot shut down helicopter. Check for cause of change.
3. **Drain oil** through cheesecloth (E112) or similar filter material (Task 6-168). Check for contamination.
4. Note if oil filter indicator button (1) is extended. If button is extended, go to step 5. If button is not extended, go to step 8.
5. Replace element in main oil filter (2) (Task 6-171).
6. Open pylon lower fairing (3) (Task 2-2).



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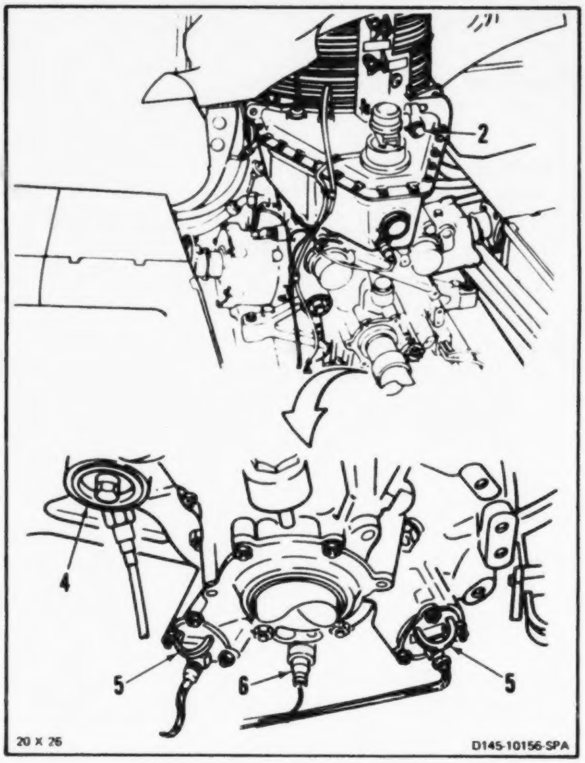
## 6-170 COMBINING TRANSMISSION SERVICEABILITY CHECK (Continued) 6-170

7. Replace auxiliary oil filter (4) (Task 6-173).
8. Remove, inspect, and **clean two debris detection screens (5)** (Task 6-174 and 6-175). Install screens (Task 6-176).
9. **Inspect chip detector (6)** (Task 6-178).
10. **If** quantity and size of **particles** obtained from filters (2 and 4), screens (5) and chip detector (6) **have not decreased by at least 30 percent** from original amount, **replace combining transmission** (Task 6-72 and 6-77).
11. **If** quantity and size of **particles** obtained from filters (2 and 4), screens (5) and chip detector (6) **have decreased by 30 percent or more, repeat steps 1 thru 9.** If any more debris is obtained, replace combining transmission (Task 6-72 and 6-77).

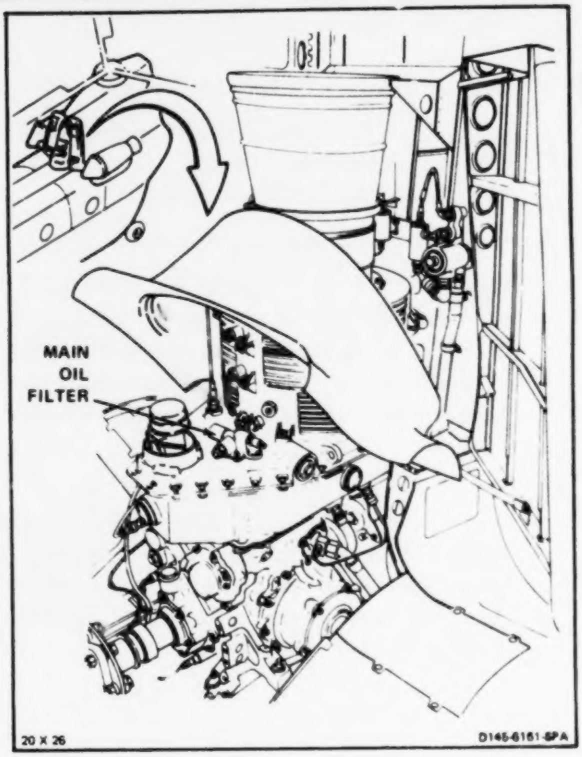


FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).

## 6-171 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER ELEMENT 6-171



INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Container, Two Quart

***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Lockwire (E231)
Gloves (E186)

***Parts:***
Filter Element
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P
Task 2-2

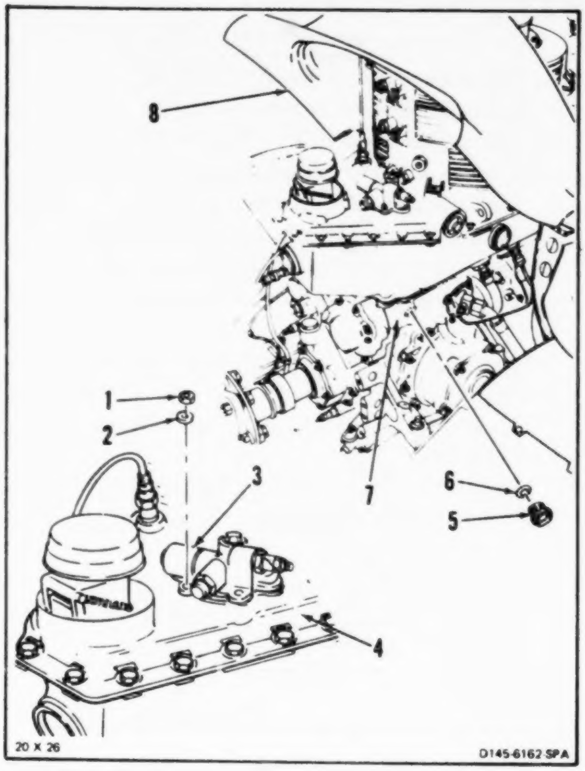
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)

***GO TO NEXT PAGE***

## 6-171 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER ELEMENT (Continued) 6-171

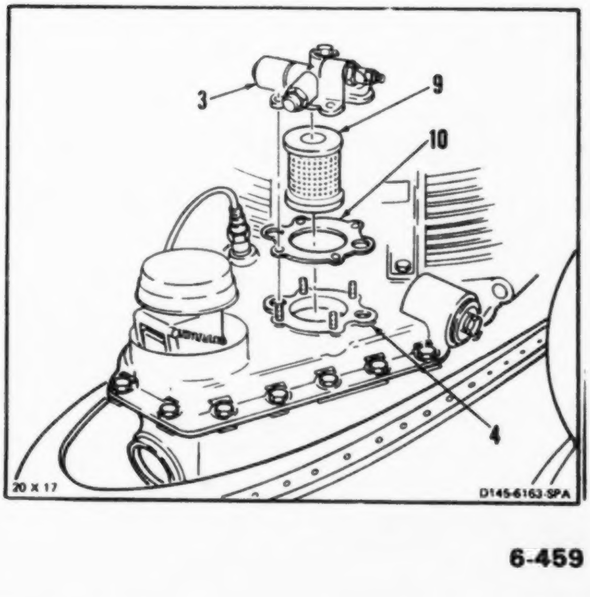
### *DRAIN OIL*

1. Remove four nuts (1) and washers (2) from filter housing (3). Loosen housing on sump cover (4).
2. Remove lockwire from drain plug (5). Remove plug and packing (6). **Drain oil** into container.
3. Install packing (6) on plug (5). Install plug. **Torque plug to 45 inch-pounds.** Lockwire plug to transmission (7) with lockwire (E231).
4. Close aft pylon lower fairing (8) (Task 2-2).



### *REMOVE FILTER ELEMENT*

5. **Remove housing (3), element (9) and gasket seal (10)** from sump cover (4).
6. Remove element (9) from housing (3).



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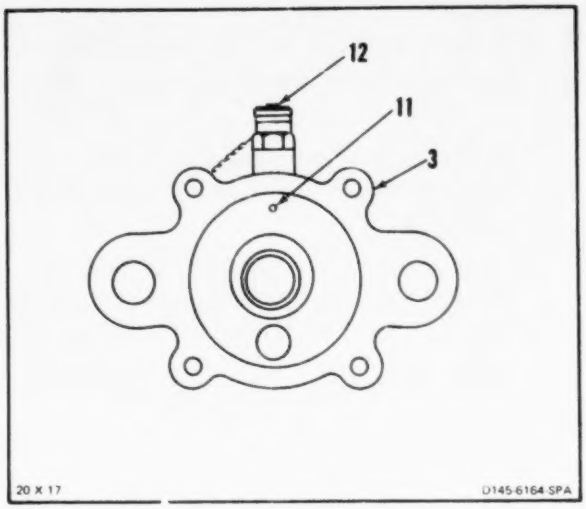
## 6-171 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER ELEMENT (Continued) 6-171

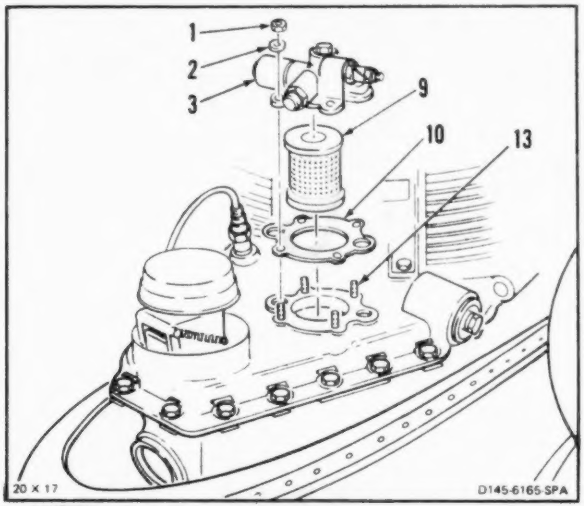
*INSTALL FILTER ELEMENT*



**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

7. Clean inside of housing (3) with dry cleaning solvent (E162) and cloths (E120). Check that hole (11) is free of debris. Wear gloves (E186).
8. Hold housing (3) with indicating button (12) up. **Push down button** until it locks.



**NOTE**

Do not reuse removed element.

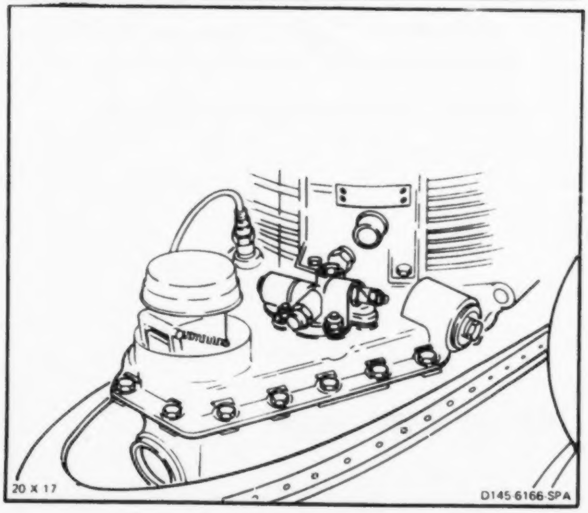
9. **Install new element (9) in housing (3).**
10. **Install gasket seal (10) and housing (3)** on four studs (13). Install four washers (2) and nuts (1). **Torque nuts to 60 inch-pounds.**

*INSPECT*

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).



END OF TASK

## 6-171.1 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR 6-171.1

INITIAL SETUP

***Applicable Configurations:***
All

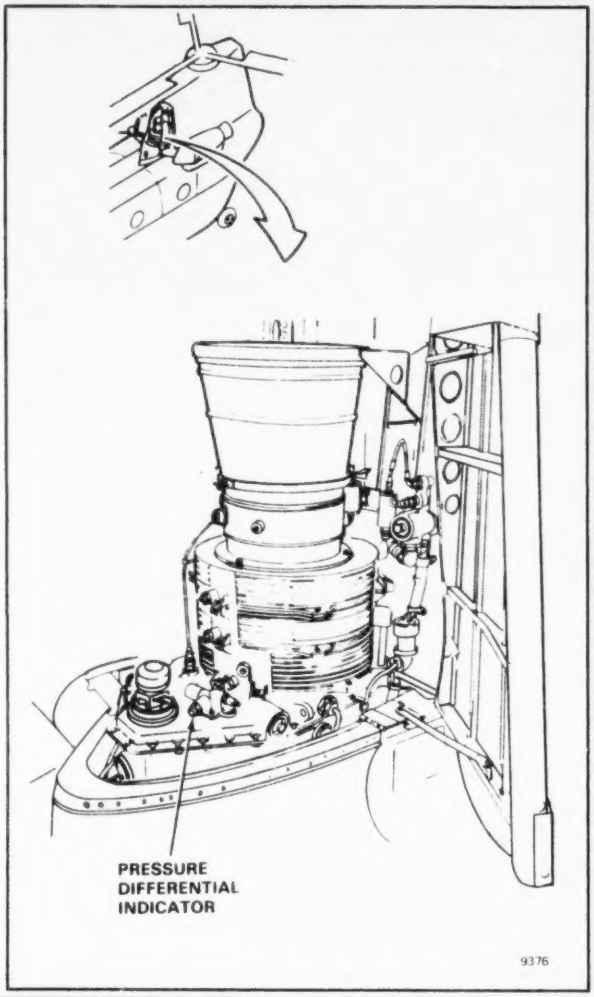
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Lockwire (E231)

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)

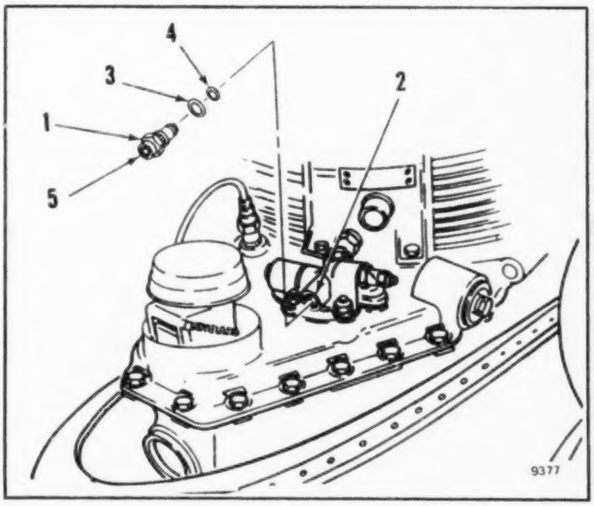


***REMOVE INDICATOR***

1. Remove lockwire from pressure differential indicator (1). **Remove indicator** from housing (2).
2. **Remove two packings (3 and 4) from indicator (1).**

***INSTALL INDICATOR***

3. **Install two packings (3 and 4)** on indicator (1).
4. Hold indicator (1) so that button (5) points up. **Check that button is pushed in** and locked.
5. **Install indicator (1)** in housing (2).



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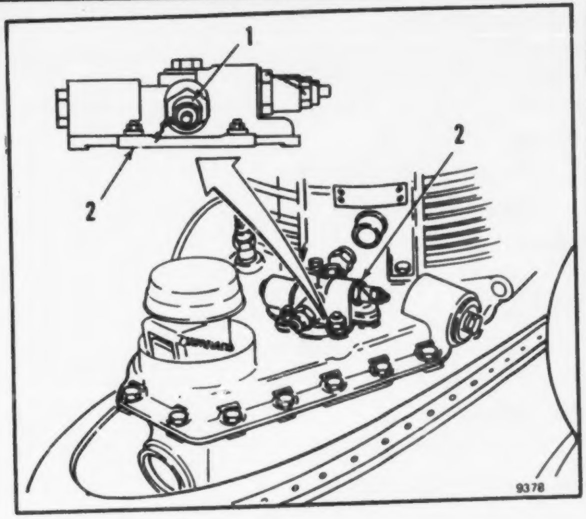
## 6-171.1 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued) 6-171.1

6. Lockwire indicator (1) to housing (2). Use lockwire (E231).

***INSPECT***



FOLLOW-ON MAINTENANCE:

Close pylon access doors (Task 2-2).

**END OF TASK**

## 6-172 ADJUST COMBINING TRANSMISSION MAIN OIL PUMP 6-172

INITIAL SETUP

***Applicable Configurations:***
All

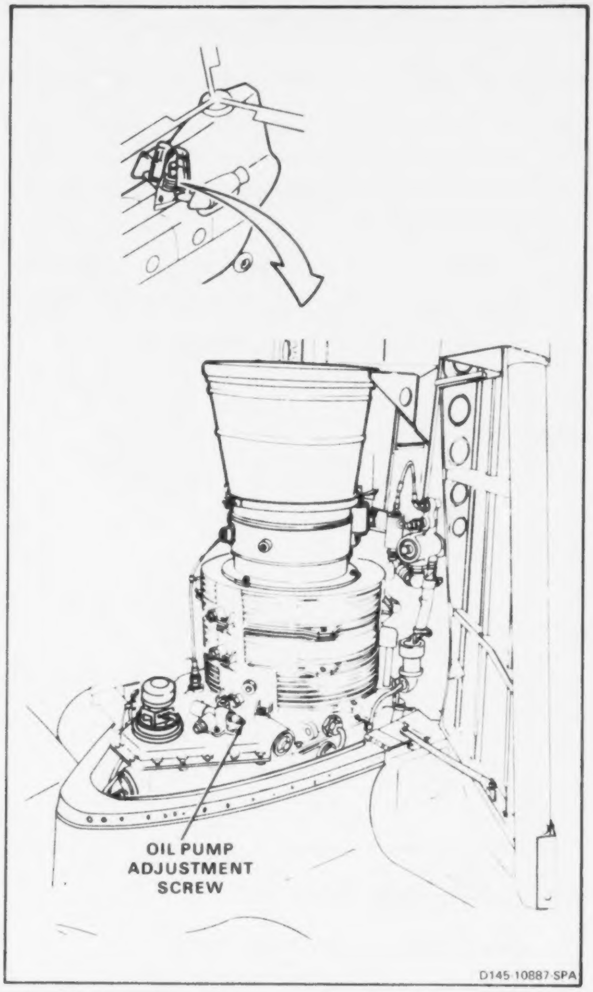
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Lockwire (E230)

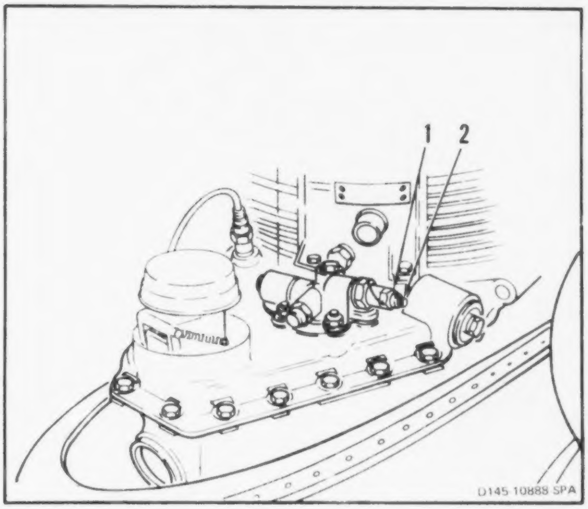
***Personnel Required:***
Medium Helicopter Repairer
Inspector
Army Rotary-Wing Aviator (2)

***References:***
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)



1. Remove lockwire from locknut (1) and setscrew (2). Hold setscrew from turning and **loosen locknut.**
2. **Turn setscrew (2) no more than 1/4 turn to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is 40 to 70 psi.
3. Hold setscrew (2) from turning. **Torque locknut (1) to 60 inch-pounds.**



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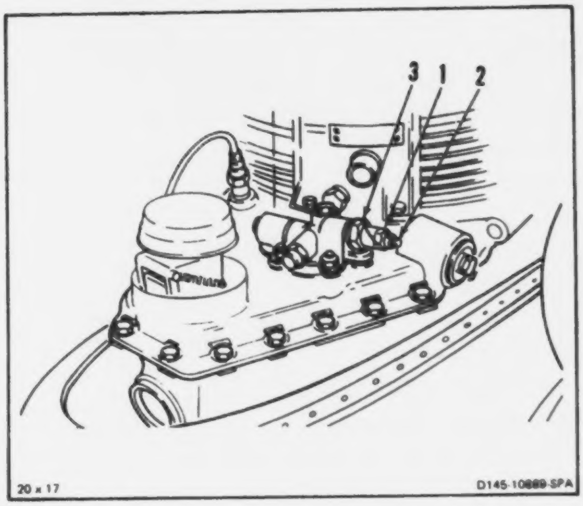
## 6-172 ADJUST COMBINING TRANSMISSION MAIN OIL PUMP (Continued) 6-172

4. Have pilot perform ground run at 100 percent rotor rpm until combining transmission oil temperature and pressure stabilize. **Record oil pressure.**
5. If oil pressure is 40 to 70 psi, go to step 6. **If pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) and setscrew (2) to retaining nut (3). Use lockwire (E230).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Close pylon access doors (Task 2-2).

**END OF TASK**

## 6-173 REPLACE COMBINING TRANSMISSION AUXILIARY OIL FILTER 6-173

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Torque Wrench, 30 to 150 Inch-Pounds

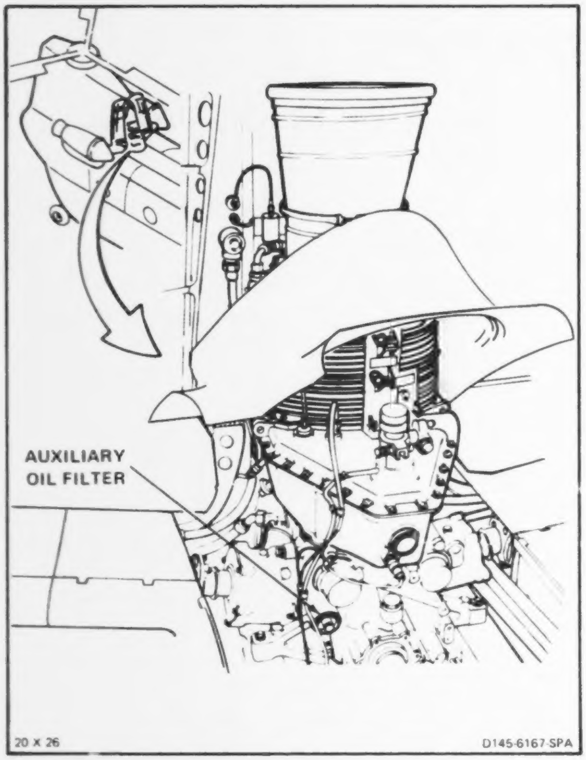
***Materials:***
Lockwire (E231)
Oil (E254)

***Parts:***
Packing
Filter

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P
Task 6-108

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)



***REMOVE FILTER***

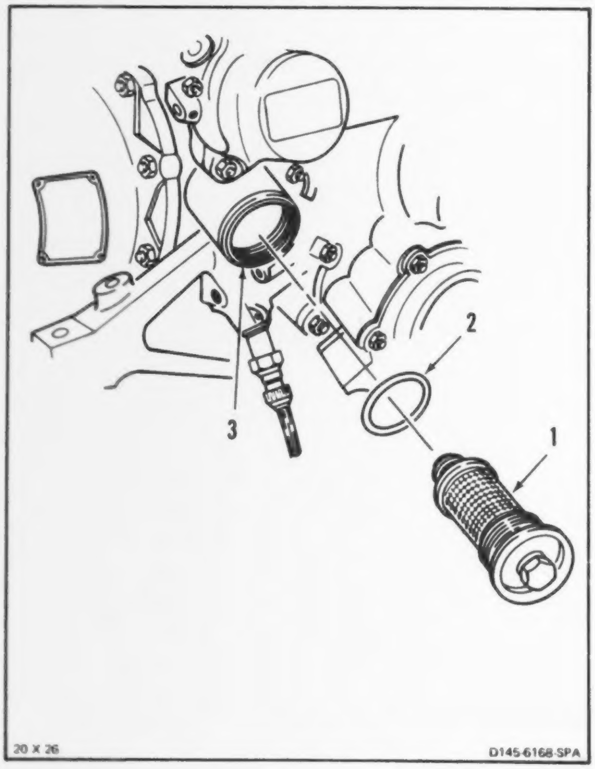
1. Remove lockwire from filter (1).

**CAUTION**

**Do not let debris enter transmission cavity. Damage can result.**

2. **Remove filter (1)** and packing (2) from transmission cavity (3). Use container to catch spilled oil.

3. **Check filter (1) for debris.** Retain debris for contamination analysis (Task 6-108).



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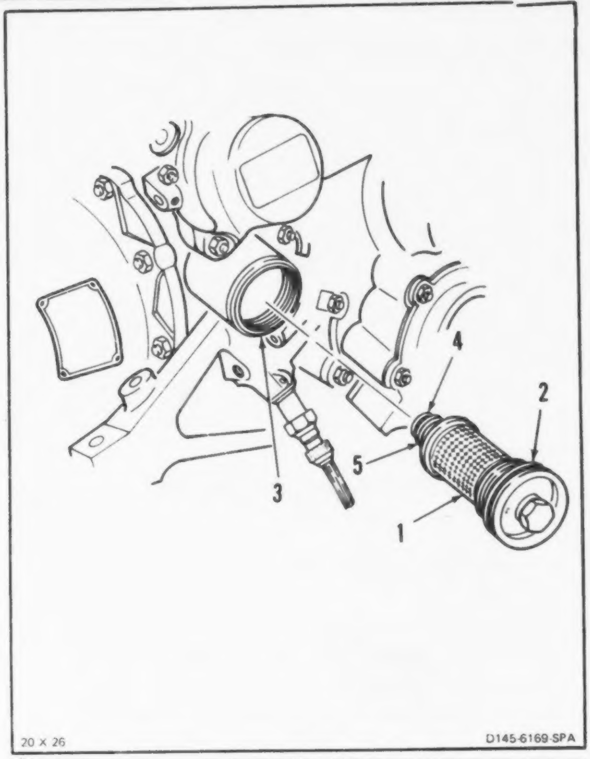
## 6-173 REPLACE COMBINING TRANSMISSION AUXILIARY OIL FILTER (Continued)

### *INSTALL FILTER*

**NOTE**

Filter is supplied with two packings installed.

4. Coat packings (2, 4, and 5) and thread of filter (1) with oil (E254).
5. **Install filter (1)** and packing (2) in transmission cavity (3). **Torque filter to 80 inch-pounds.**



6. Lockwire filter (1) to transmission lug (6). Use lockwire (E231).

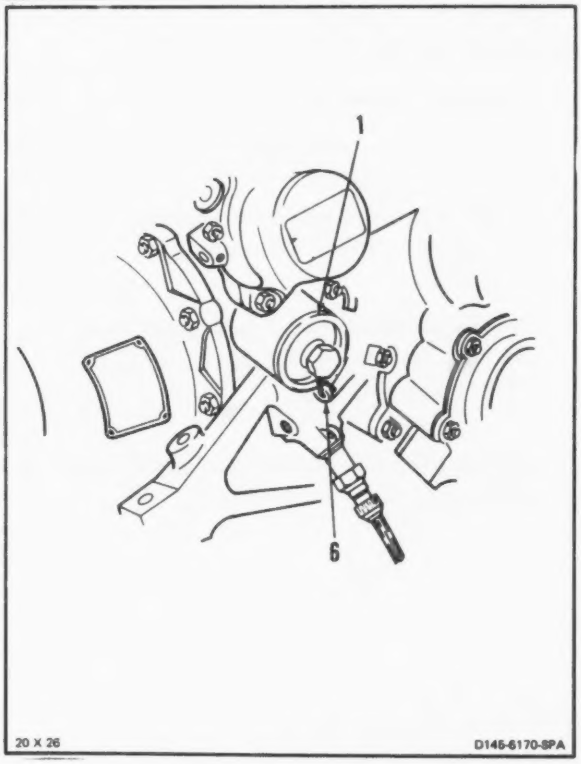
### *INSPECT*

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon doors (Task 2-2).



**END OF TASK**

## 6-174 REMOVE COMBINING TRANSMISSION DEBRIS DETECTION SCREEN 6-174

INITIAL SETUP

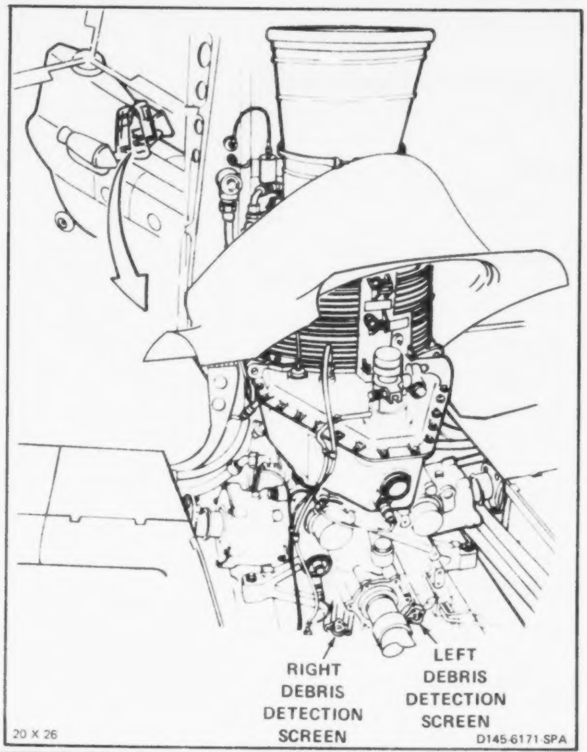
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Cloths (E120)

***Personnel Required:***
67U10 Medium Helicopter Repairer

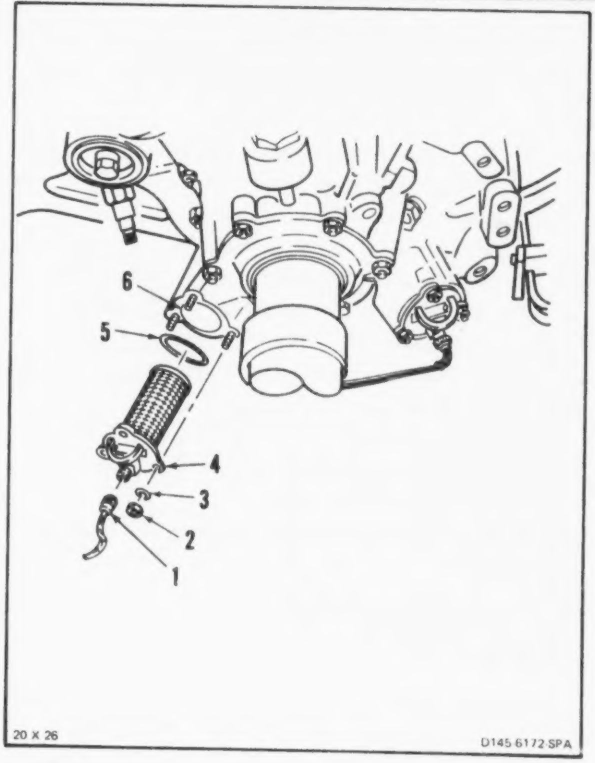
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)


RIGHT DEBRIS DETECTION SCREEN
LEFT DEBRIS DETECTION SCREEN
20 X 26
D145-6171-SPA

### NOTE

Procedure is same to remove left or right screen. Removal of right screen is shown here.

1. **Disconnect electrical connector (1).**
2. **Remove three nuts (2)** and washers (3).
3. Place cloths (E120) under screen (4) to absorb spilled oil. **Remove screen** and packing (5) from transmission cavity (6).


6
5
4
3
2
1
20 X 26
D145-6172-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-175 INSPECT COMBINING TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Goggles

***Materials:***
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***References:***
Task 6-108

***Equipment Condition:***
Off Helicopter Task

---

1. **Check screen (1)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

**WARNING**

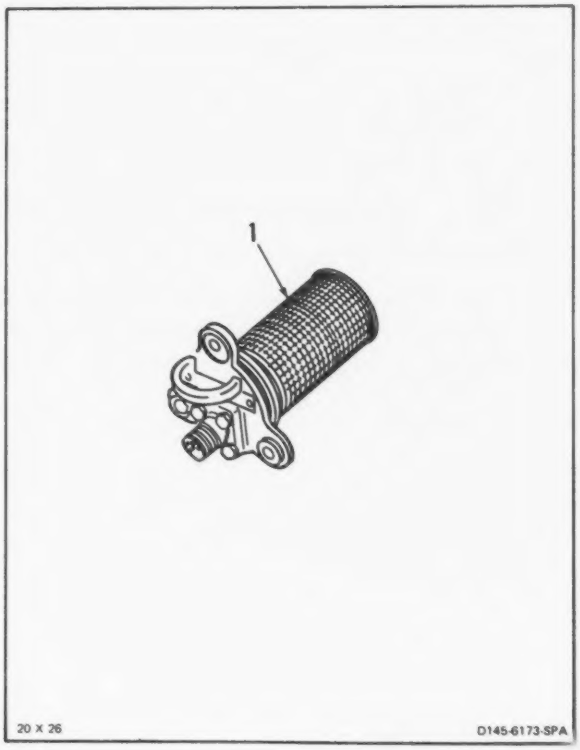
**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

2. Clean screen with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
3. **Inspect screen (1)** for tears. There shall be no tears.

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**



## 6-176 INSTALL COMBINING TRANSMISSION DEBRIS DETECTION SCREEN 6-176

INITIAL SETUP

***Applicable Configurations:***
All

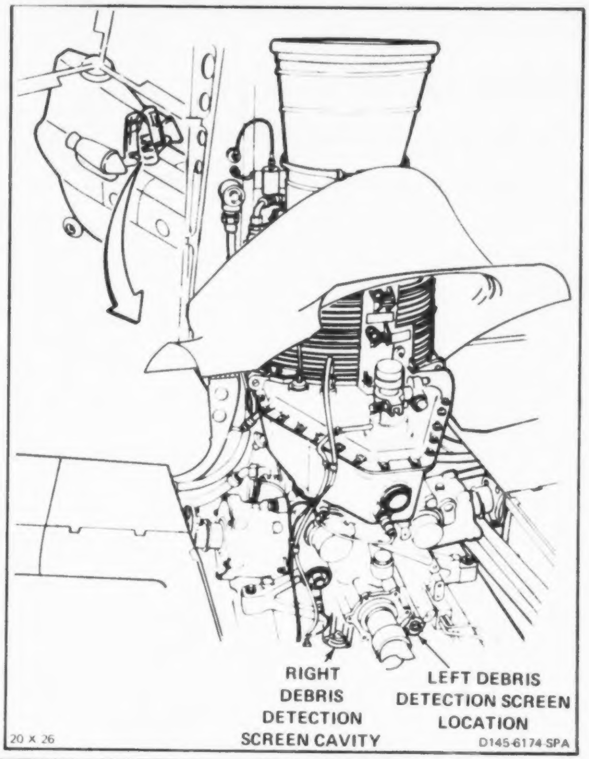
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
None

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

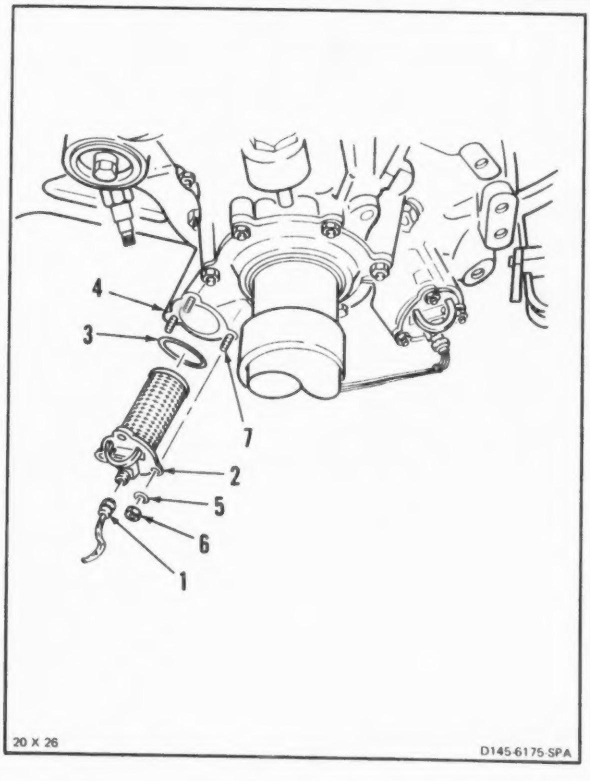
***References:***
TM 55-1520-240-23P
TM 55-1520-240-T


RIGHT DEBRIS DETECTION SCREEN CAVITY
LEFT DEBRIS DETECTION SCREEN LOCATION
20 x 26
D145-6174-SPA

**NOTE**

Procedure is same to install left or right screen. Installation of right screen shown here.

1. **Connect electrical connector (1)** to screen (2).
2. **Perform operational check** of engine transmission debris detection system (TM 55-1520-240-T).
3. Install packing (3) on screen (2). **Install screen** in transmission cavity (4).
4. **Install** three washers (5) and **nuts (6)** on studs (1). **Torque nuts to 60 inch-pounds.**


4
3
7
2
5
6
1
20 x 26
D145-6175-SPA

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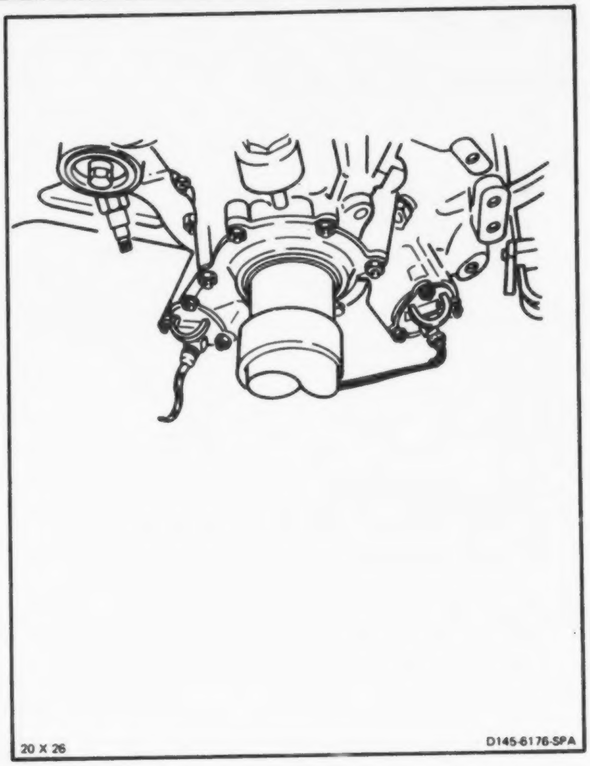
## 6-176 INSTALL COMBINING TRANSMISSION DEBRIS DETECTION SCREEN (Continued) 6-176

FOLLOW-ON MAINTENANCE:

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).



**END OF TASK**

## 6-177 REMOVE COMBINING TRANSMISSION CHIP DETECTOR 6-177

INITIAL SETUP

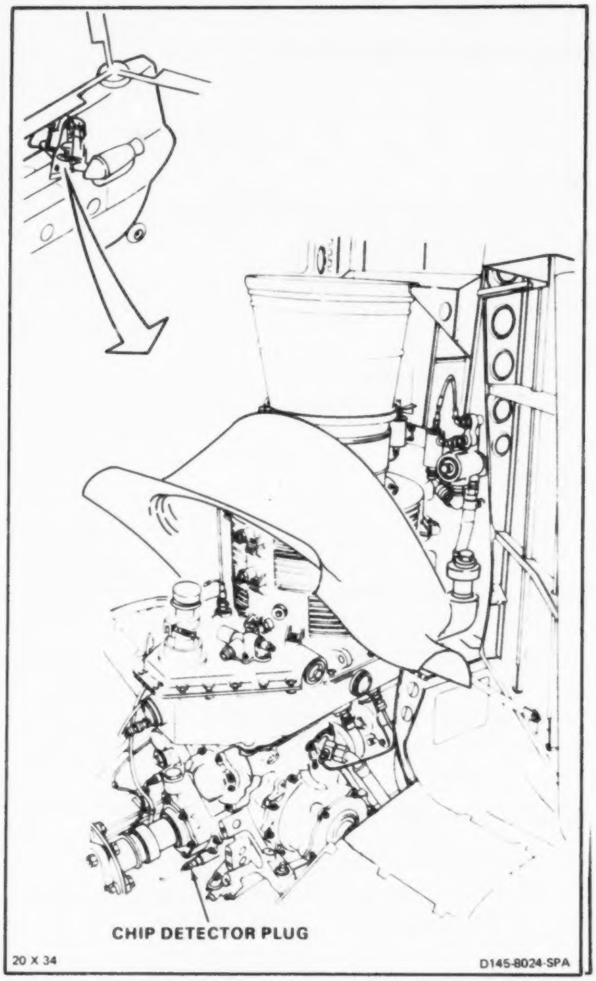
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Cloths (E120)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



1. **Disconnect electrical connector (1)** from chip detector (2). Remove lockwire.
2. Position cloths under chip detector (2) to absorb oil spillage.

**NOTE**

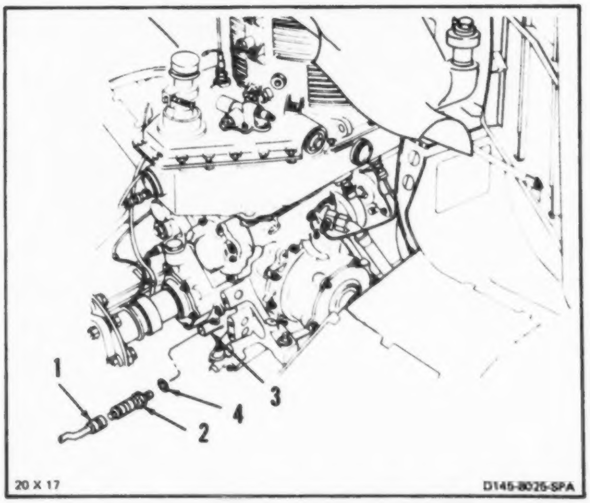
When detector is removed, oil will drain from port. Plug port quickly to prevent oil drainage.

3. **Remove chip detector (2).** Quickly plug port (3) to stop oil drainage.
4. Remove packing (4) from chip detector (2).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**



## 6-178 INSPECT COMBINING TRANSMISSION CHIP DETECTOR PLUG

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

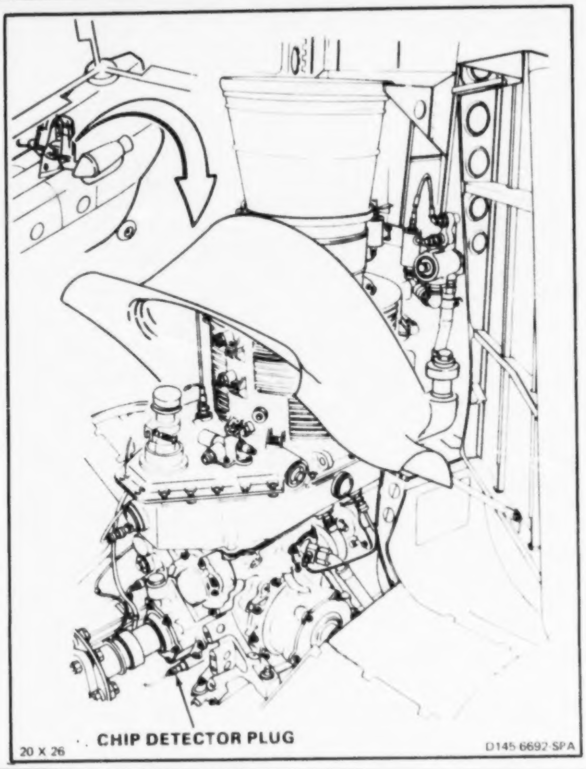
***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

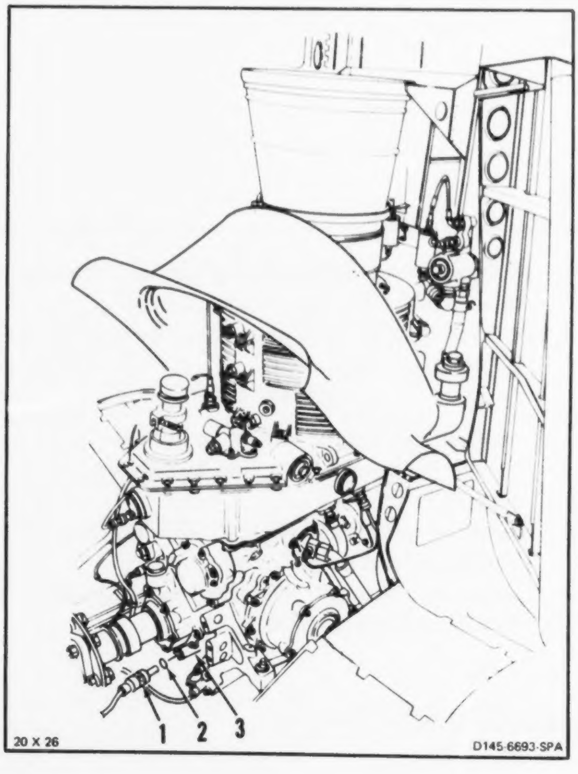
***References:***
TM 55-1520-240-23P
TM 55-1520-240-T
Task 6-108

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



### *REMOVE PLUG*

1. Push in chip detector plug (1) and turn it counterclockwise. **Remove plug** and packing (2) from chip detector body (3).



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## 6-178 INSPECT COMBINING TRANSMISSION CHIP DETECTOR PLUG (Continued) 6-178

*INSPECT PLUG*

**NOTE**

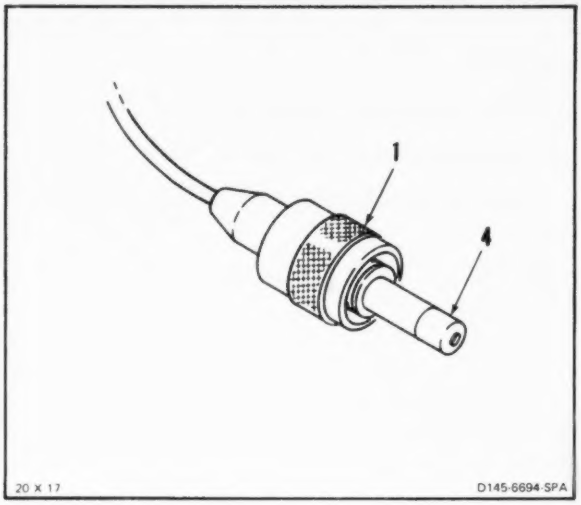
Some metal fuzz on tip of plug is normal.

2. **Check tip (4) on plug (1) for chips.** Save chips for contamination analysis (Task 6-108).

**WARNING**

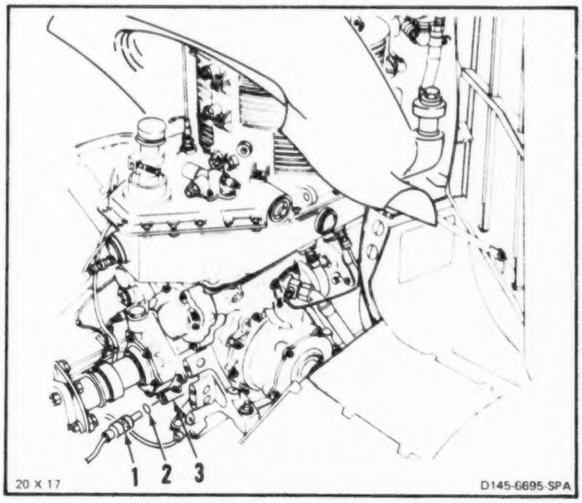
**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

3. **Clean tip (4)** with dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186). Dry tip.
4. **Perform operational check** of combining transmission chip detector system (TM 55-1520-240-T).



*INSTALL PLUG*

5. **Install plug (1)** and packing (2) in chip detector body (3). Push in and turn plug clockwise to lock.



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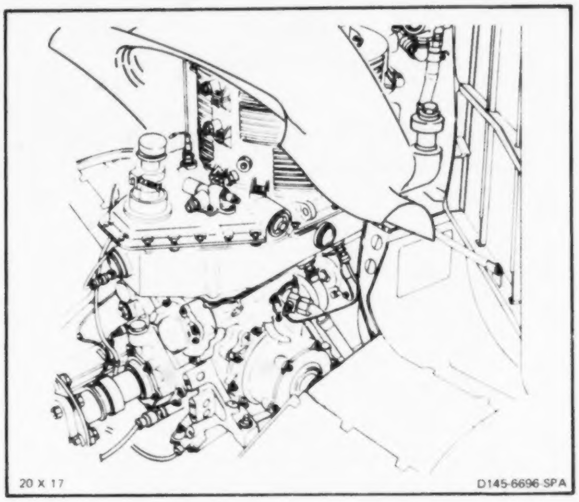
## 6-178 INSPECT COMBINING TRANSMISSION CHIP DETECTOR PLUG (Continued) 6-178



***INSPECT***

FOLLOW-ON MAINTENANCE:

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).

**END OF TASK**

## 6-179 INSTALL COMBINING TRANSMISSION CHIP DETECTOR 6-179

INITIAL SETUP

***Applicable Configurations:***
All

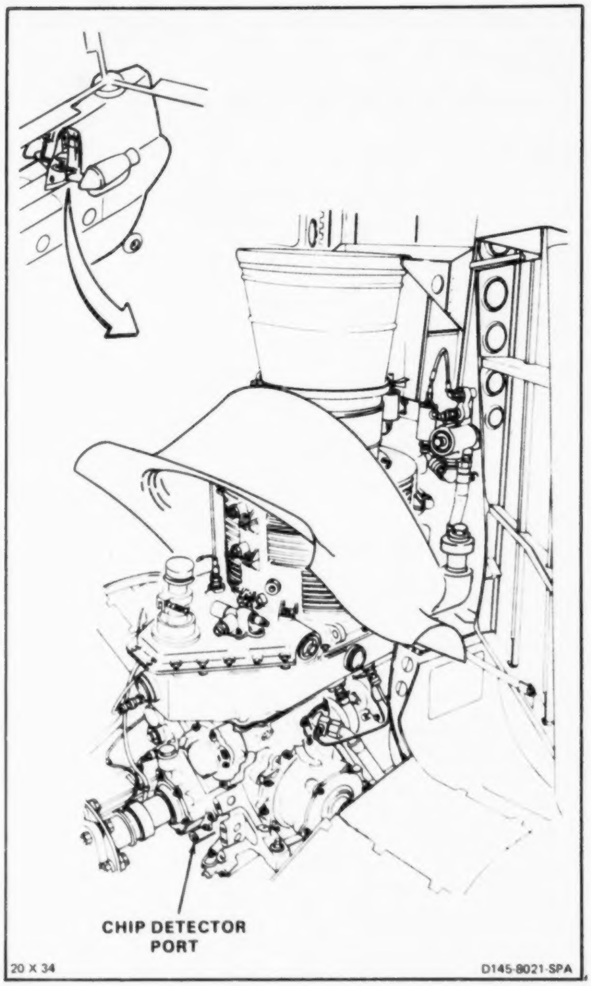
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Lockwire (E231)
Oil (E254)

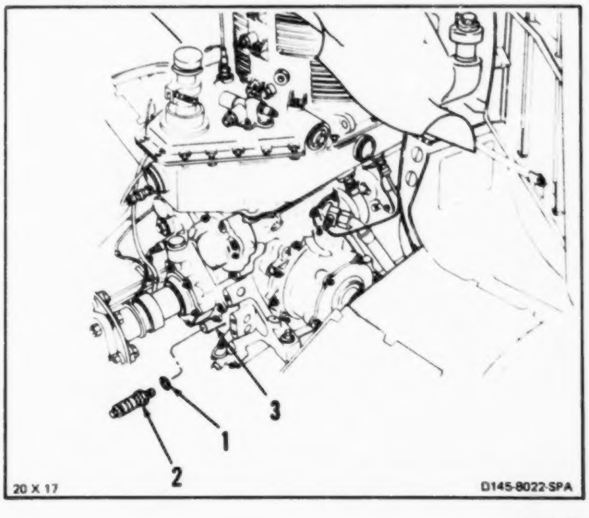
***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P



1. Coat packing (1) and thread of chip detector (2) with oil (E254). **Install packing** on chip detector.
2. **Install chip detector (2)** in transmission port (3). **Torque chip detector to 80 inch-pounds.**



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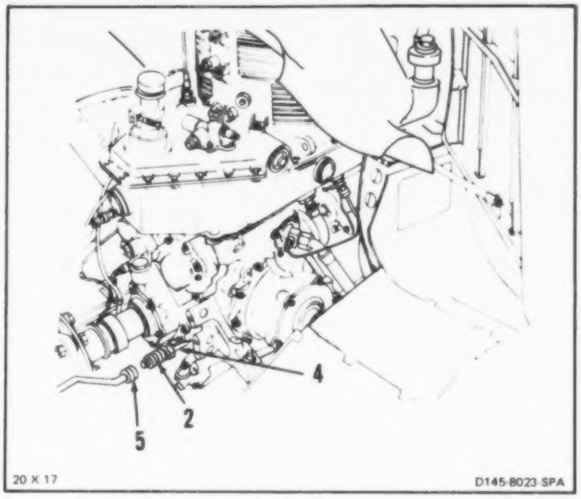
## 6-179 INSTALL COMBINING TRANSMISSION CHIP DETECTOR (Continued) 6-179

3. **Lockwire chip detector (2)** to transmission (4). Use lockwire (E231).
4. **Connect electrical connector (5).**

***INSPECT***



FOLLOW-ON MAINTENANCE:

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).

**END OF TASK**

## 6-180 REMOVE COMBINING TRANSMISSION INLET SCREEN 6-180

INITIAL SETUP

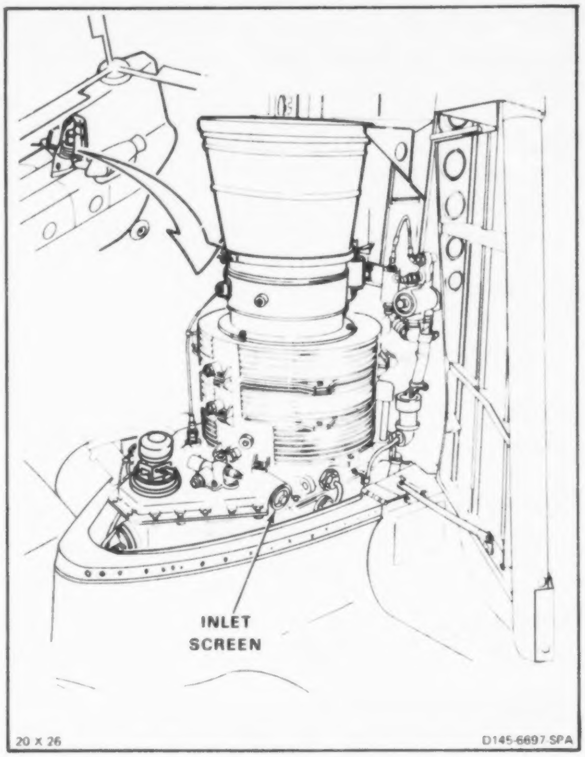
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Barrier Material (E80)
Masking Tape (E388)
Cloths (E120)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)



1. Remove lockwire from inlet screen (1).

**CAUTION**

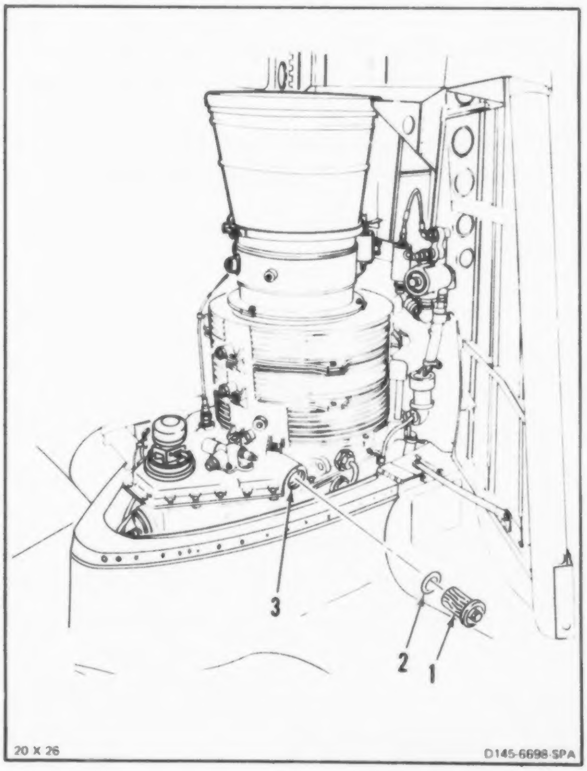
**Do not let debris enter transmission cavity. Damage can result.**

2. **Remove screen (1)** and packing (2) from transmission cavity (3). Use cloths (E120) to catch spilled oil.
3. Cover cavity (3) with barrier material (E80) and tape (E388).

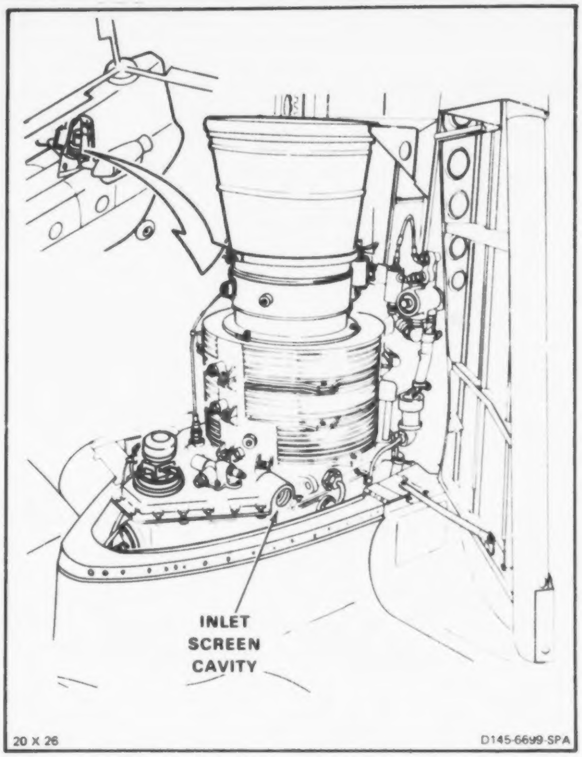
FOLLOW-ON MAINTENANCE:

None

**END OF TASK**



## 6-181 INSTALL COMBINING TRANSMISSION INLET SCREEN 6-181



INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Oil (E254)
Lockwire (E231)

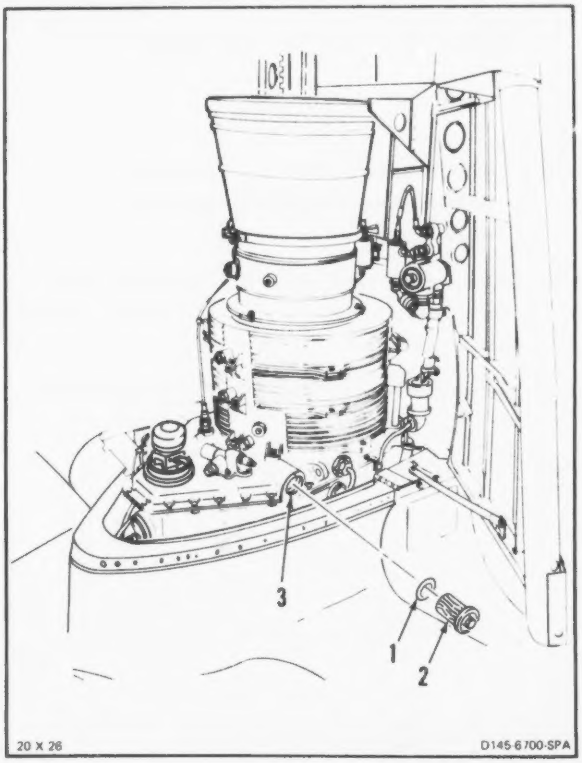
***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Inlet Screen Inspected (Task 6-131)

1. Coat packing (1) and thread of inlet screen (2) with oil (E254). **Install packing on screen.**
2. **Install screen (2)** in transmission cavity (3). **Torque screen to 80 inch-pounds.**



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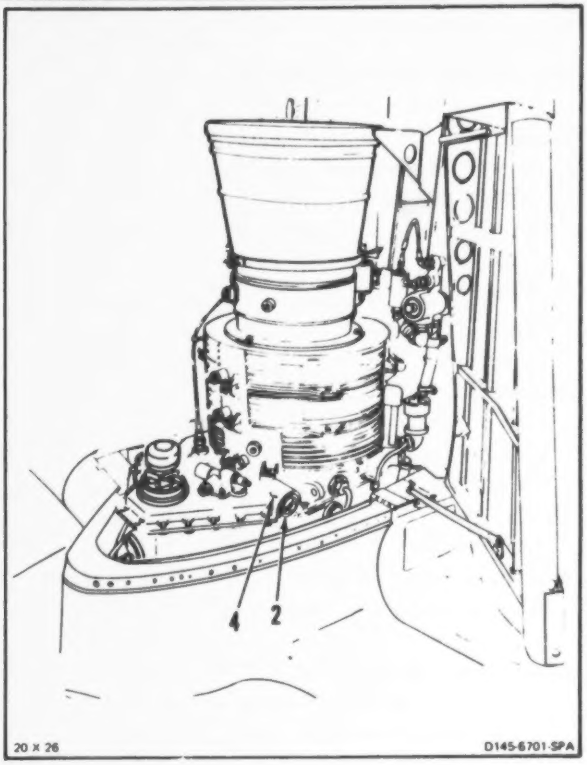
## 6-181 INSTALL COMBINING TRANSMISSION INLET SCREEN (Continued) 6-181

3. Lockwire screen (2) to transmission (4). Use lockwire (E231).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Close aft pylon access doors (Task 2-2).

**END OF TASK**

## 6-181.1 REPLACE COMBINING TRANSMISSION OIL COOLER BYPASS VALVE 6-181.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Container, 2-Quart (2)
Hose, 1-Inch ID, 36 Inches Long
Funnel

***Materials:***

Cloths (E120)
Lockwire (E231)
Oil (E254)

***Parts:***

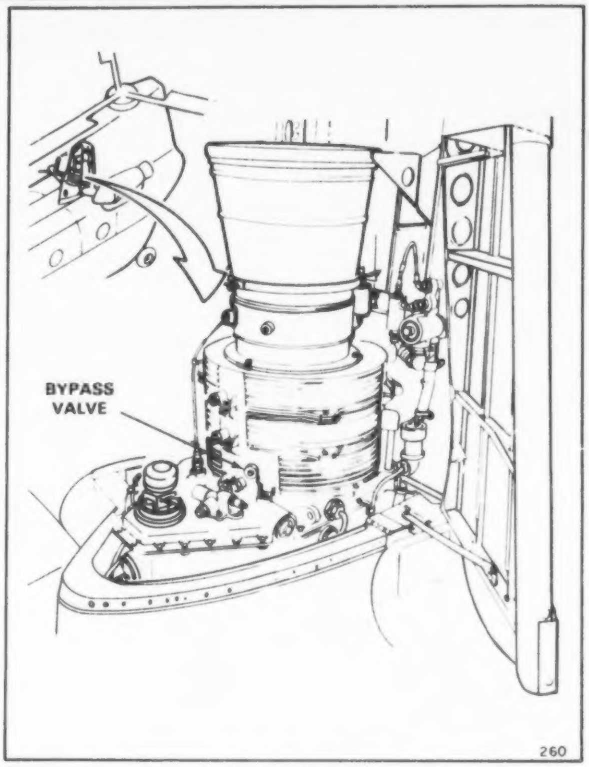
Packings (2)

***Personnel Required:***

Medium Helicopter Repairer
Inspector

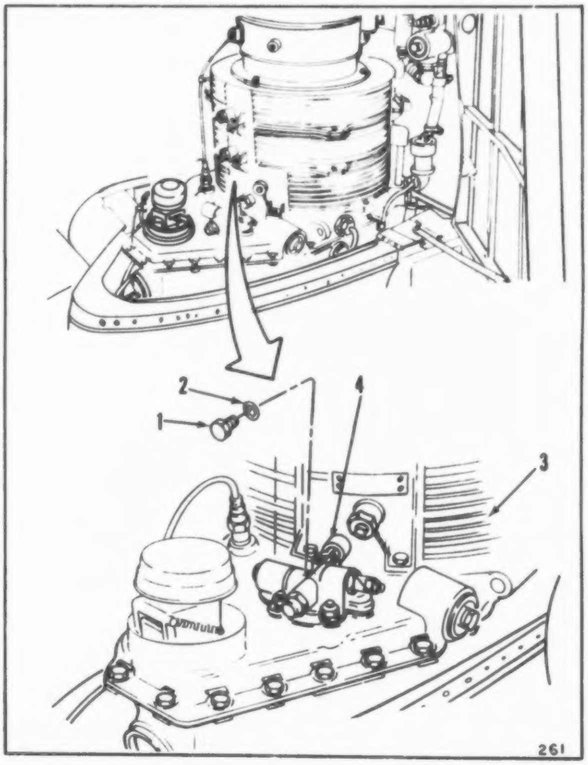
***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



***DRAIN OIL COOLER***

1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2) from oil cooler (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
3. Install drain plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



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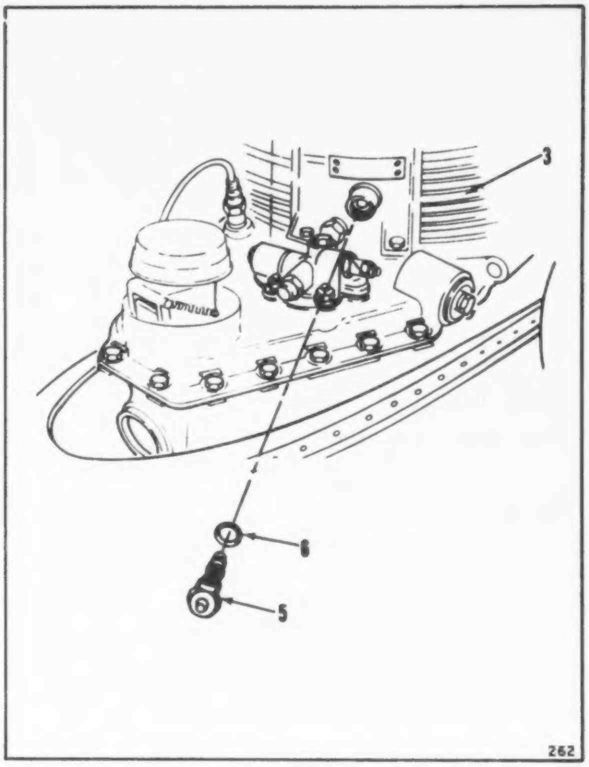
## 6-181.1 REPLACE COMBINING TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-181.1

***REMOVE BYPASS VALVE***

**NOTE**

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). **Remove valve** from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).



***INSTALL VALVE***

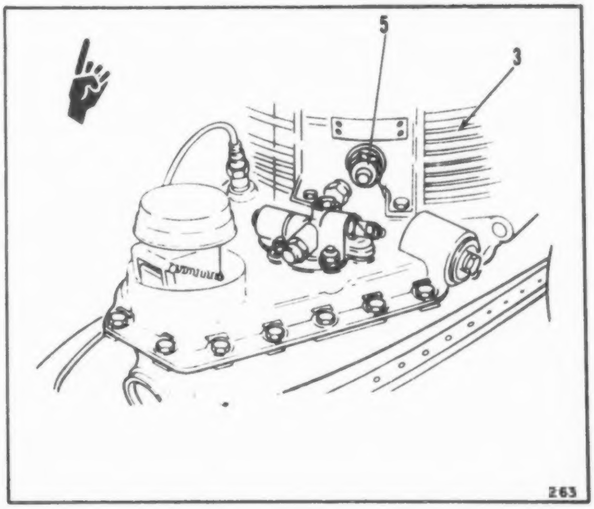
**WARNING**

**Oil (E253 or E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

**Oil (E253 or E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**

6. Coat packing (6) and thread of bypass valve (5) with oil (E254). **Install packing** on valve.
7. **Install valve (5)** in oil cooler (3). **Torque valve to 80 inch-pounds.**
8. Lockwire valve (5) to oil cooler (3). Use lockwire (E231).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

**END OF TASK**

## 6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST DUCT 6-181.2

INITIAL SETUP

***Applicable Configurations:***
All

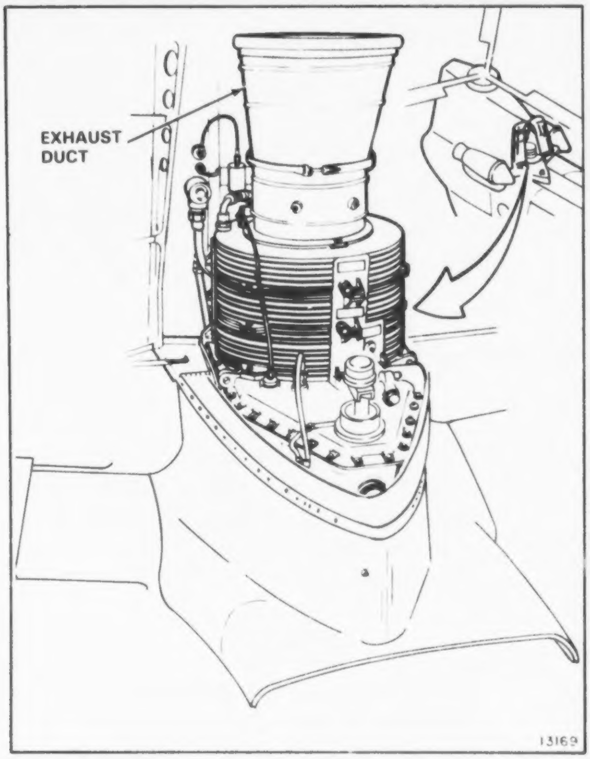
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Oil (E254)

***Parts:***
Rivets
Washers
Seal (Appendix E-56)

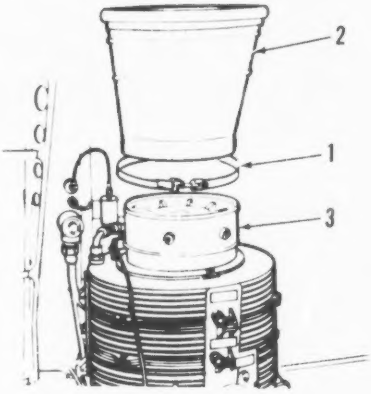
***Personnel Required:***
Aircraft Structural Repairer

***Equipment Condition:***
Battery Disconnected
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



***REMOVE DUCT ASSEMBLY***

1. **Loosen clamp (1)** securing duct assembly (2) to fan (3).
2. **Remove duct assembly (2)** and clamp (1).



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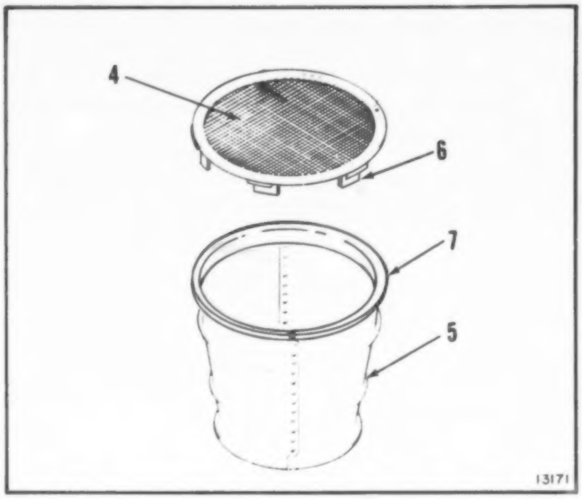
## 6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST DUCT (Continued) 6-181.2

***INSPECT DUCT ASSEMBLY***

3. **Lift screen (4) out of duct assembly (5).**
4. **Check screen (4)** for holes and tears. Check clips (6) for cracks and looseness. There shall be no such damage.
5. **Check seal (7).** Seal shall be flexible, with no rips.
6. **Check duct assembly (5)** for holes, tears, and cracks that go all the way through the duct. There shall be no such damage.

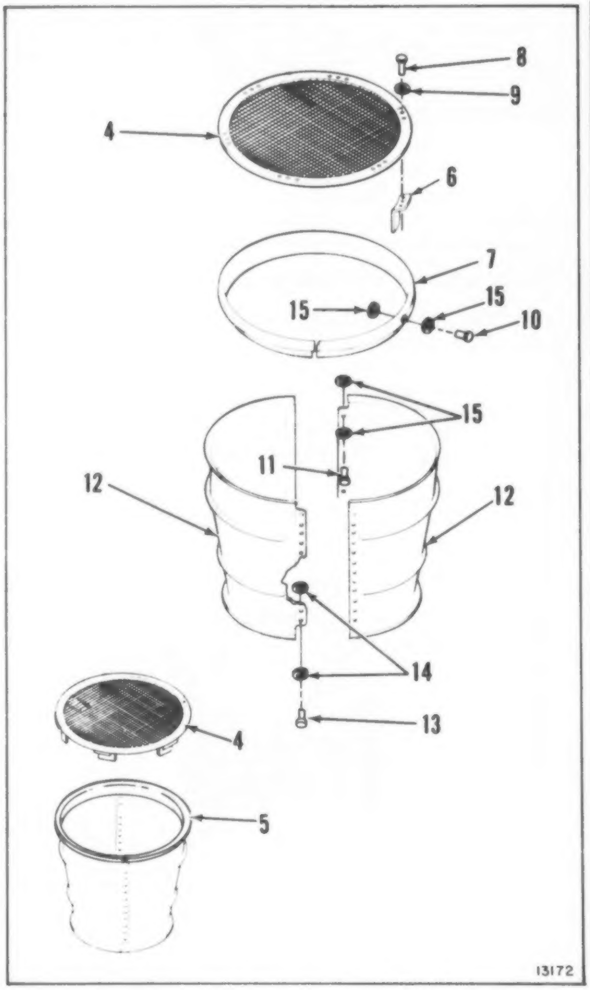


***REPAIR DUCT ASSEMBLY***

**NOTE**

Repair of duct is limited to replacement of parts.

7. Remove any of six clips (6) from screen (4) by drilling out rivets (8). Install new clips with new rivets and washers (9).
8. Remove seal (7) by drilling out rivets (10) and (11).
9. Separate duct halves (12) by drilling out rivets (13) at both ends of halves.
10. Join duct halves (12) with rivets (13) and washers (14). Use one washer under head and one under tail of each rivet.
11. Install new seal (E-56) (7). Use rivets (10 and 11) and washers (15). Use one washer under head and one under tail of each rivet.
12. Install screen (4) on duct assembly (5).



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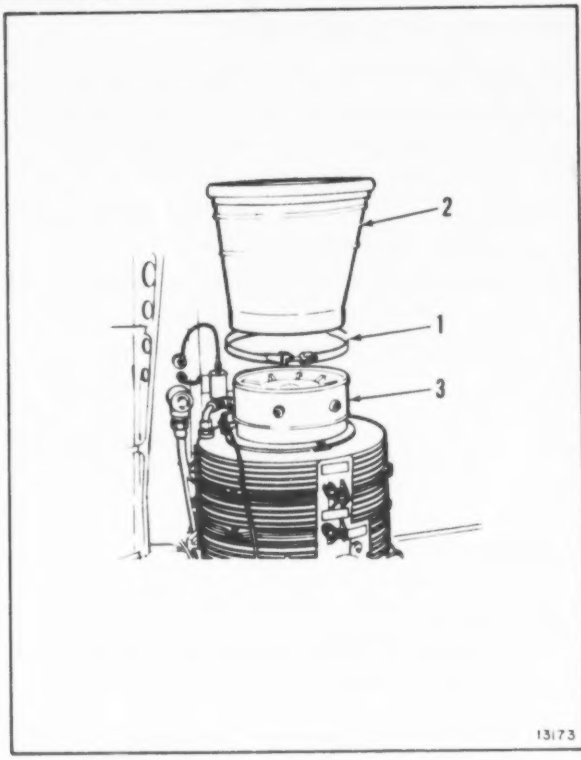
## 6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST DUCT (Continued) 6-181.2

***INSTALL DUCT ASSEMBLY***

13. Coat thread of clamp (1) with oil (E254). **Install clamp (1)** around bottom of duct assembly (2).
14. **Install duct** assembly on fan (3). **Torque clamp to 33 inch-pounds.**



FOLLOW-ON MAINTENANCE:

Close Pylon Hinged Fairing (Task 2-2).

**END OF TASK**

## 6-182 REMOVE COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 6-182

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***

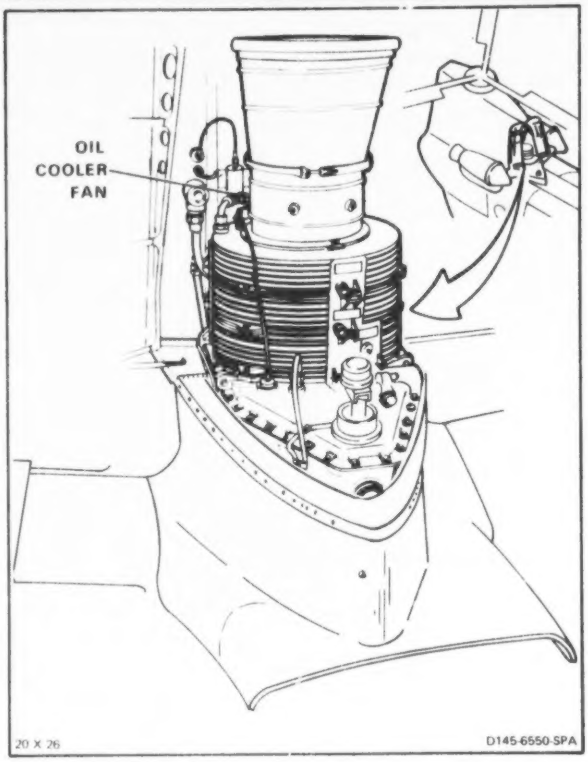
None

***Personnel Required:***

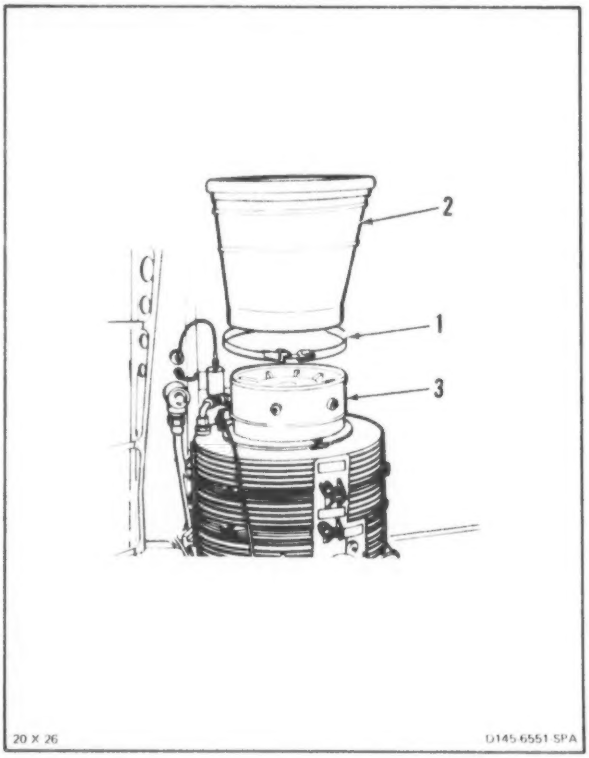
Medium Helicopter Repairer

***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)


OIL
COOLER
FAN
20 X 26
D145-6550-SPA

1. **Loosen clamp (1)** securing duct (2) to fan (3).
2. **Remove duct (2)** and clamp (1).


2
1
3
20 X 26
D145-6551-SPA

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## 6-182 REMOVE COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT (Continued) 6-182

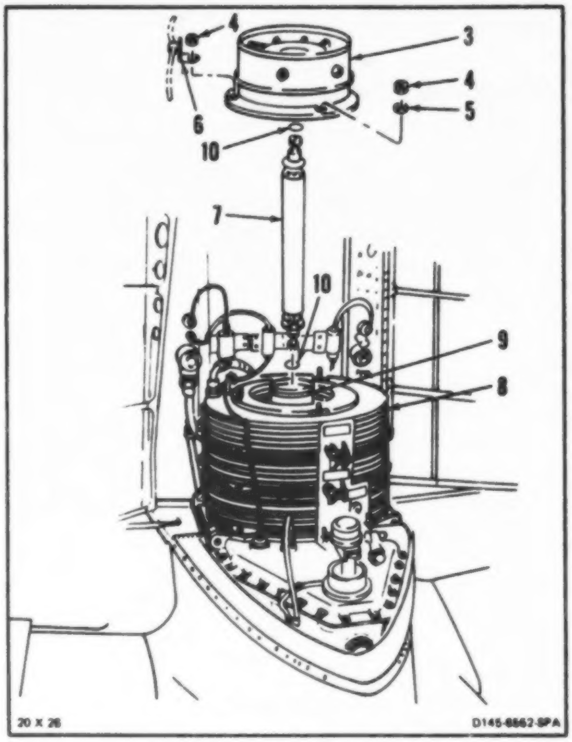
3. **Remove four nuts (4),** three washers (5), and bracket (6) from fan (3).

**NOTE**

Drive shaft may come out with fan or stay in transmission. Shaft is about 30 inches long.

4. **Lift fan (3)** straight up until drive shaft (7) clears cooler (8). **Remove shaft** from baffle (9) or fan. Identify the upper end of the drive shaft with tape or marker.

5. Remove two packings (10) from shaft.



FOLLOW-ON MAINTENANCE:

Inspect Combining Transmission Oil Cooler Fan Assembly and Fan Drive Shaft (Task 6-182.1).

**END OF TASK**

## 6-182.1 INSPECT COMBINING TRANSMISSION OIL COOLER FAN ASSEMBLY AND FAN DRIVE SHAFT. 6-182.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Hand Lubricating Gun

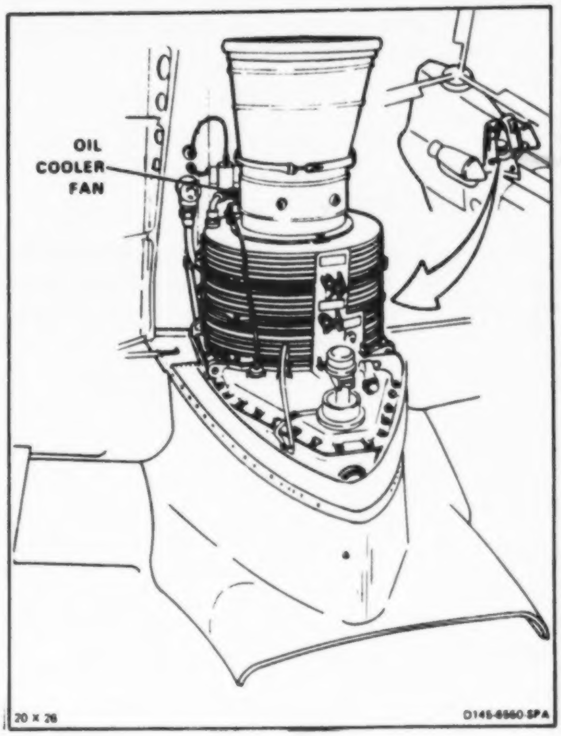
***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Gloves (E186)
Oil (E254)

***Parts:***
Packings:

***Personnel Required:***
Medium Helicopter Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Combining Transmission Oil
Cooler Fan and Shaft Removed (Task 6-182)



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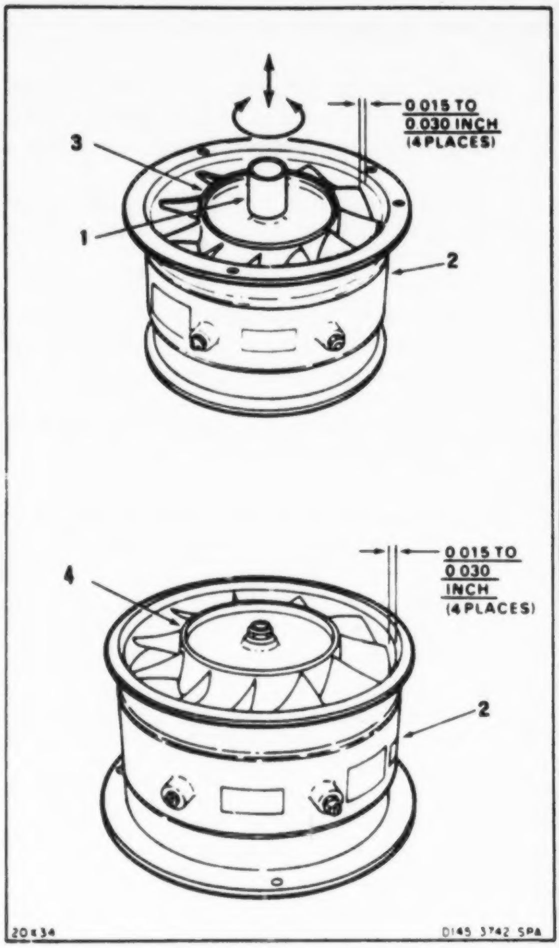
## 6-182.1 INSPECT COMBINING TRANSMISSION OIL COOLER FAN ASSEMBLY AND FAN DRIVE SHAFT (Continued) 6-182.1

### *CHECK ASSEMBLY*

1. **Turn fan shaft (1)** by hand several turns. There shall be no binding or noise. Look for evidence of overheating, discoloration, or paint blistering.
2. **Try to move shaft (1)** in and out of housing (2). There shall be no free play in shaft.
3. **Measure gap between vanes of impellers (3 and 4) and side of housing (2)** at four places, 90 degrees apart, around housing. Gap shall be 0.015 to 0.030 inch.
4. Attempt to rotate one impeller (3 or 4) with respect to the other by securing one impeller and the housing and rotating the other impeller. No rotation is allowed.


0.015 TO
0.030 INCH
(4 PLACES)
3
1
2
0.015 TO
0.030
INCH
(4 PLACES)
4
2
20x34
D145 3742 SPA

GO TO NEXT PAGE

## 6-182.1 INSPECT COMBINING TRANSMISSION OIL COOLER FAN ASSEMBLY AND FAN DRIVE SHAFT (Continued) 6-182.1

5. **Install the fan (5) without the drive shaft (1).** Rotate the fan (5) to insure clearance with the baffle (6). No ribbing or binding is allowed.

6. Install the fan drive shaft (1) upper and lower splines (7) for wear. If wear is noticed, proceed as follows.

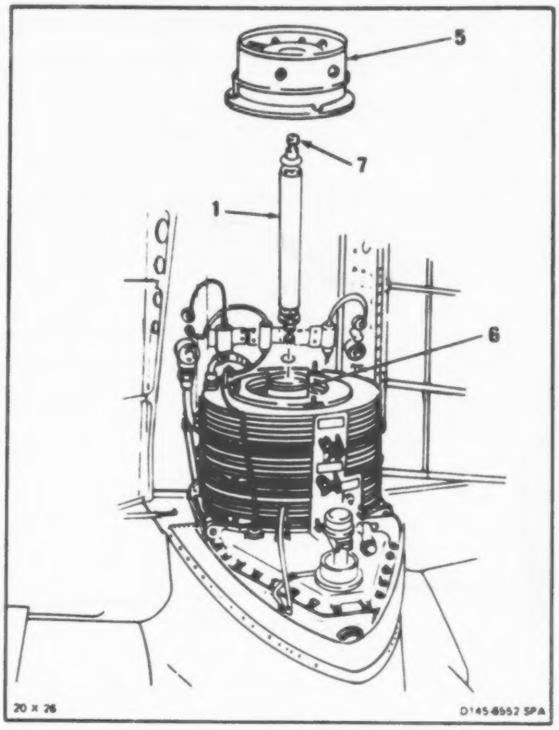
   a. Place a 6 inch metal ruler or equivalent straight edge along the length of the spline, with the ruler spanning the worn area.

   b. Using a fealer gage, measure the depth of wear below the face of the spline.

   c. If the upper spline wear exceeds 0.010 inch, replace the drive shaft and fan assembly.

   d. If the lower spline wear exceeds 0.010 inch, replace the drive shaft and the combining transmission.

   e. If wear is less than 0.010 inch, the drive shaft and mating parts are satisfactory for continued use.



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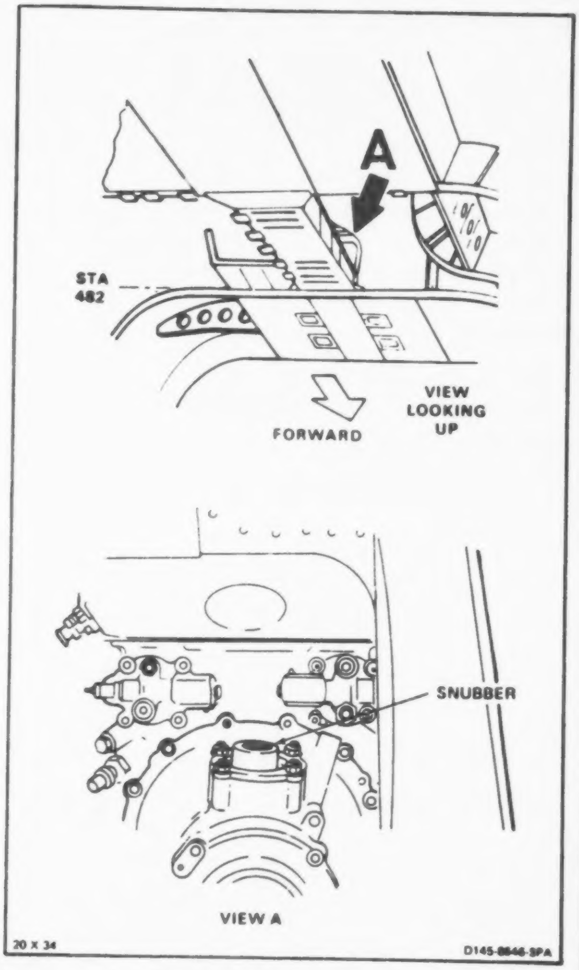
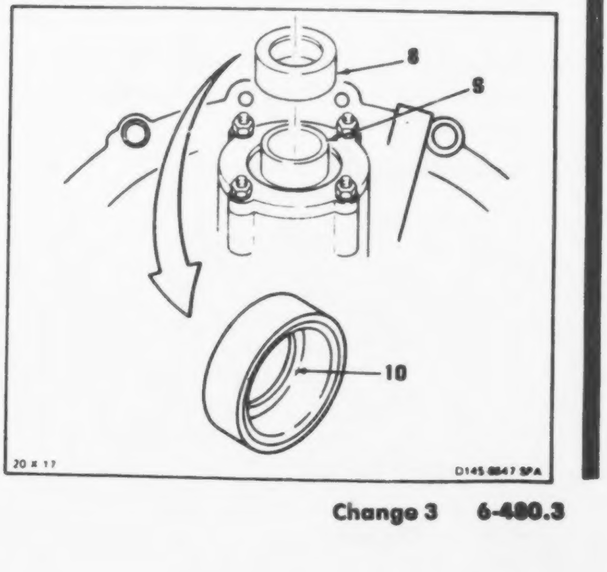
## 6-182.1 INSPECT COMBINING TRANSMISSION OIL COOLER FAN ASSEMBLY AND FAN DRIVE SHAFT (Continued) 6-182.1

7. **Lift snubber (8)** from around end of output shaft (9).

8. **Check snubber (8)** for cuts, tears, and erosion of seating surface (10). There shall be no such damage.

9. **Install snubber (8)** over end of output shaft (9). Make sure snubber is fully seated.


A
STA 482
FORWARD
VIEW LOOKING UP
SNUBBER
VIEW A
20 X 34
D145-8846-3PA


8
9
10
20 X 17
D145-8847-3PA

### INSPECT

FOLLOW-ON MAINTENANCE:

Install Combining Transmission Oil Cooler Fan and Shaft (Task 6-186).

GO TO NEXT PAGE

## 6-183 DISASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) 6-183

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit,
NSN 5180-00-003-5267

Gun Type Heater

Pyrometer

Asbestos Gloves (E187)

Arbor Press

Wood Dowel, 3/4-Inch x 12 Inches

Drift, Brass or Aluminum

***Materials:***

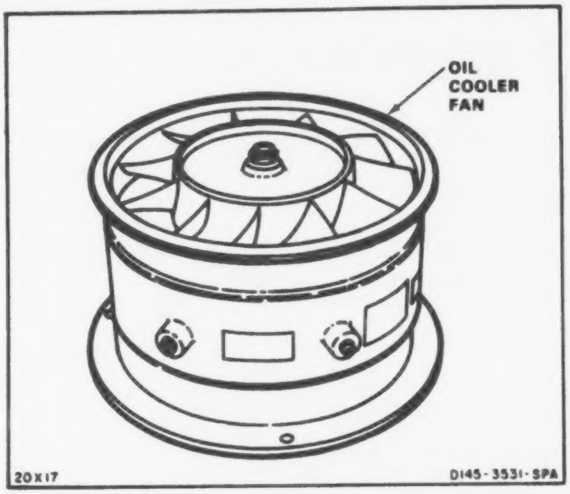
None

***Personnel Required:***

68D20 Aircraft Powertrain Repairer

***Equipment Condition:***

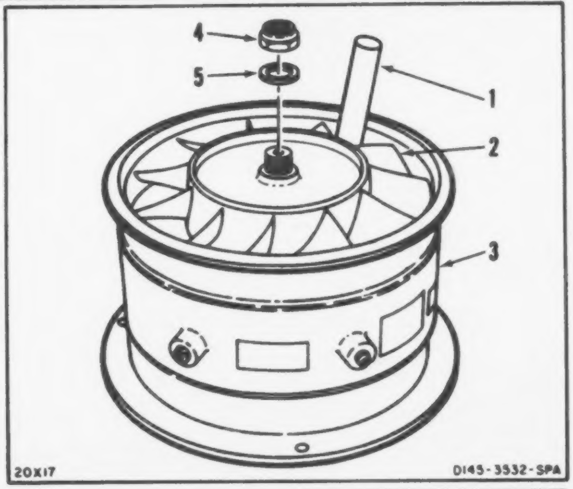
Off Helicopter Task


OIL COOLER FAN
20X17
D145-3531-SPA

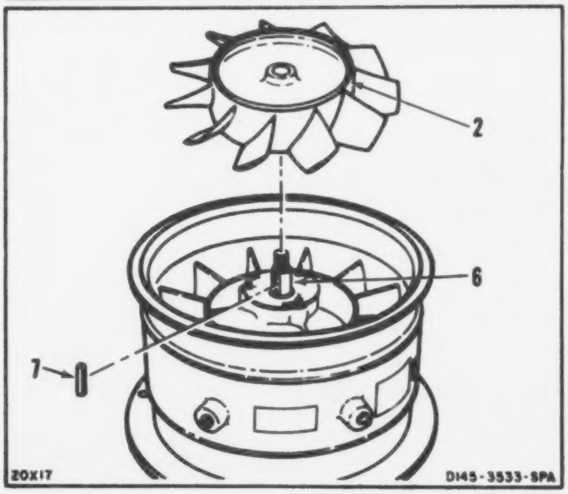
**NOTE**

Wood dowel keeps impeller from turning when removing nut.

1. Insert wood dowel (1) between vanes of impeller (2) and housing (3).
2. **Remove nut (4)** and washer (5).
3. Remove dowel (1).


4
5
1
2
3
20X17
D145-3532-SPA

4. **Remove impeller (2)** from shaft (6). If needed, pull on impeller while tapping shaft with soft-faced mallet.
5. **Remove key (7)** from shaft (6).


2
6
7
20X17
D145-3533-SPA

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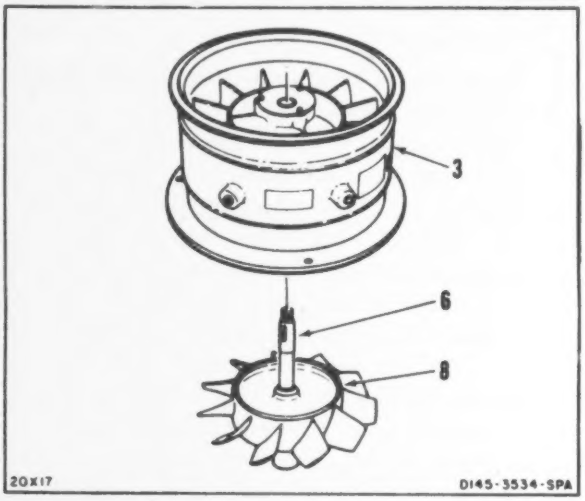
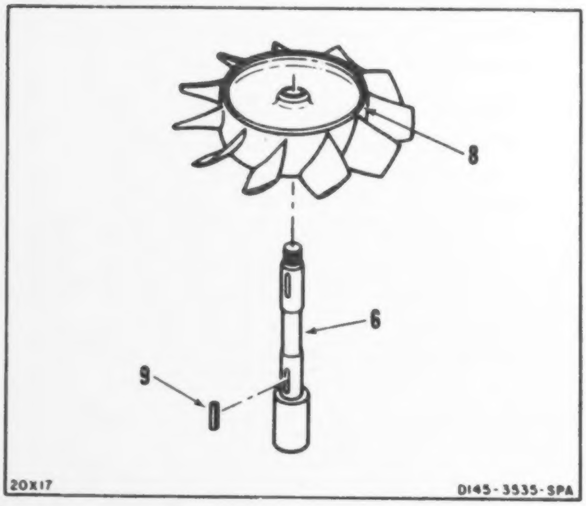
## 6-183 DISASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-183

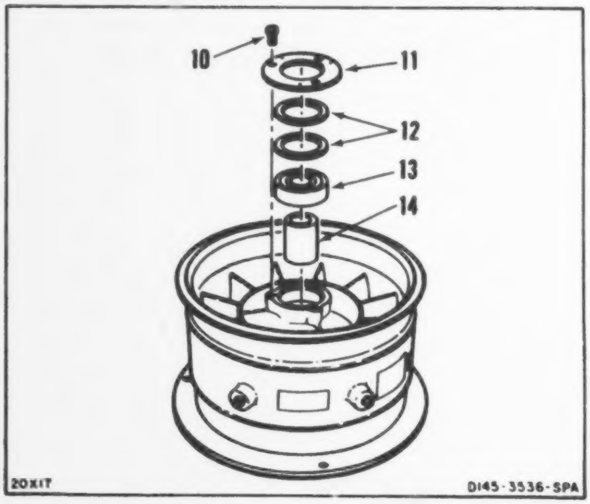
6. **Remove shaft (6)** and impeller (8) from housing (3). Use brass or aluminum drift.


3
6
8
20X17
D145-3534-SPA

7. **Remove impeller (8)** from shaft (6). Support impeller and tap out shaft with soft-faced mallet if needed.
8. **Remove key (9)** from shaft (6).


8
6
9
20X17
D145-3535-SPA

9. **Remove** lockwire, three screws (10) and **retainer (11).**
10. Remove two spring washers (12).
11. **Remove bearing (13).** Use brass or aluminum drift.
12. **Remove spacer (14).**


10
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20X17
D145-3536-SPA

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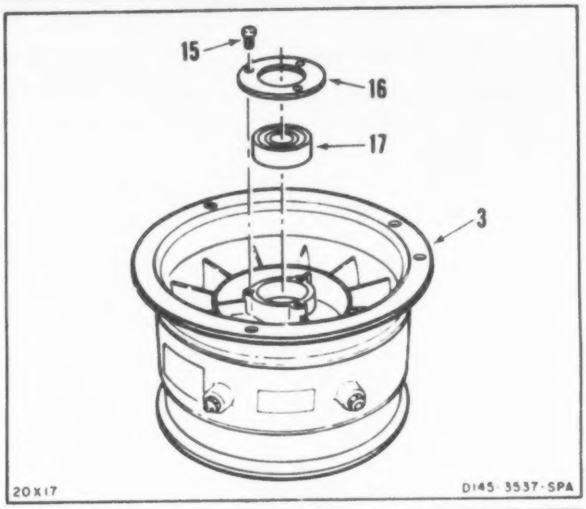
## 6-183 DISASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-183

13. Turn housing (3) over 180 degrees.
14. **Remove** lockwire, three screws (15), and **retainer (16).**
15. **Remove bearing (17).** Use brass or aluminum drift, if needed.


15
16
17
3
20X17
D145-3537-SPA

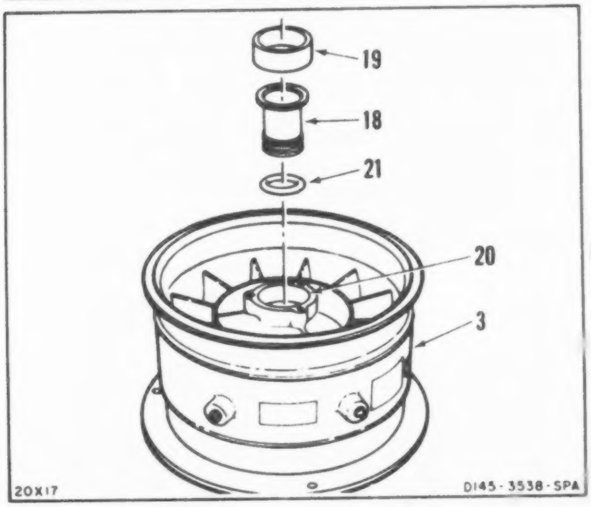
16. Turn housing (3) over 180 degrees.
17. **Remove grease sleeve (18) and bearing liner (19).** If needed, use heat and arbor press as follows:

**WARNING**

**Wear asbestos gloves when handling heated parts.**

   a. Heat area around bore (20) to 230 to 250°F (110 to 120°C). Use heat gun. Wear asbestos gloves (E187). Measure temperature with pyrometer.
   b. Remove sleeve (18) and liner (19). Use arbor press, if needed.

18. Remove packing (21) from sleeve (18).


19
18
21
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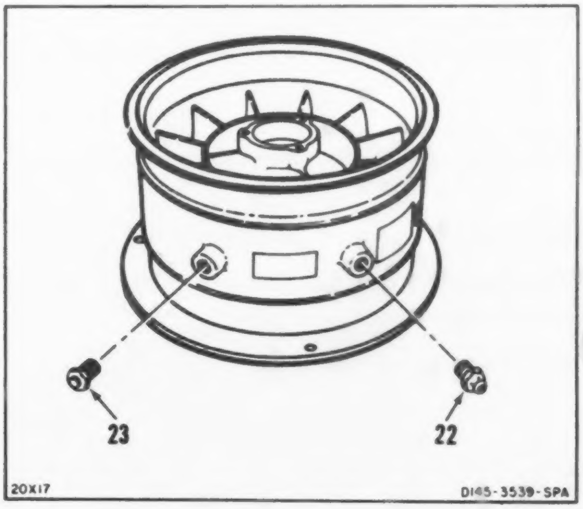
3
20X17
D145-3538-SPA

19. Remove grease fitting (22) and vent fitting (23).

FOLLOW-ON MAINTENANCE:

None


23
22
20X17
D145-3539-SPA

**END OF TASK**

## 6-183.1 REPAIR COMBINING TRANSMISSION OIL COOLER FAN 6-183.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Dial Indicating Depth Gage 643J
Goggles

***Materials:***

Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Barrier Material (E80)
Masking Tape (E388)
Gloves (E186)
Acetic Acid (E21)
Chromic Acid (E114)
Calcium Sulphate (E91)
Epoxy Primer (E293)
Black Lacquer Topcoat (E215)

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 43-0103
MIL-M-3171, Type VI
MIL-C-22751

***Equipment Condition:***

Off Helicopter Task

***General Safety Instruction:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

*GO TO NEXT PAGE*

## 6-183.1 REPAIR COMBINING TRANSMISSION OIL COOLER FAN (Continued) 6-183.1

**NOTE**

Repairable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** location and extent of **damage** on fan parts:

   **NOTE**

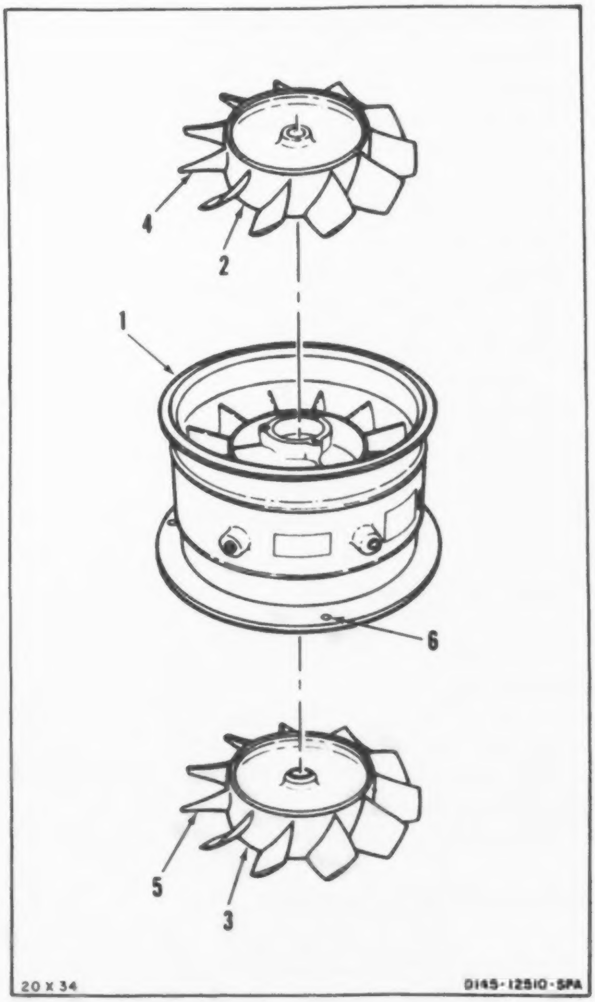
   Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage on housing (1) shall not be more than 0.025 inch.**

   b. **Depth of damage on impellers (2 and 3) shall not be more than 0.015 inch. There shall be no more than four damaged areas on one impeller blade (4 or 5).**

   c. **Damage shall not extend over more than one surface or enter any radius.**

   d. **Damage shall not be closer than 1.00 inch to any mounting hole (6).**
3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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## 6-183.1 REPAIR COMBINING TRANSMISSION OIL COOLER FAN (Continued) 6-183.1

6. Acid-etch reworked area as follows:

   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**

   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**

   c. **Rinse area with cold water.**

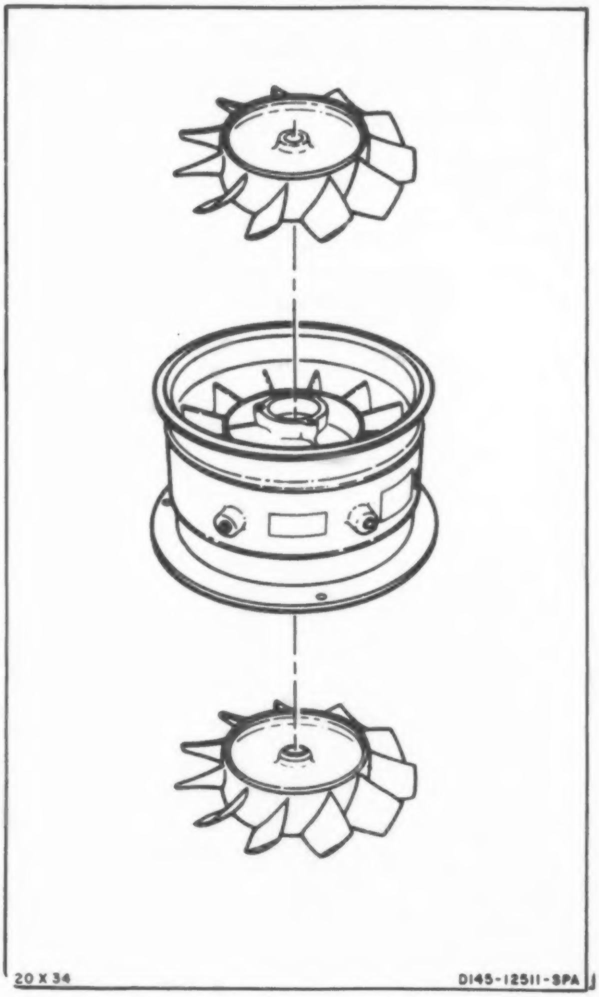
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**

8. **Clean** reworked area **with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.

9. Swab on solution of chromic acid (E114) and calcium sulphate (E91) (MIL-M-3171, Type VI). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse area with cold water and let air dry.

10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.

11. **Apply black lacquer** topcoat (E215) (MIL-C-22751).

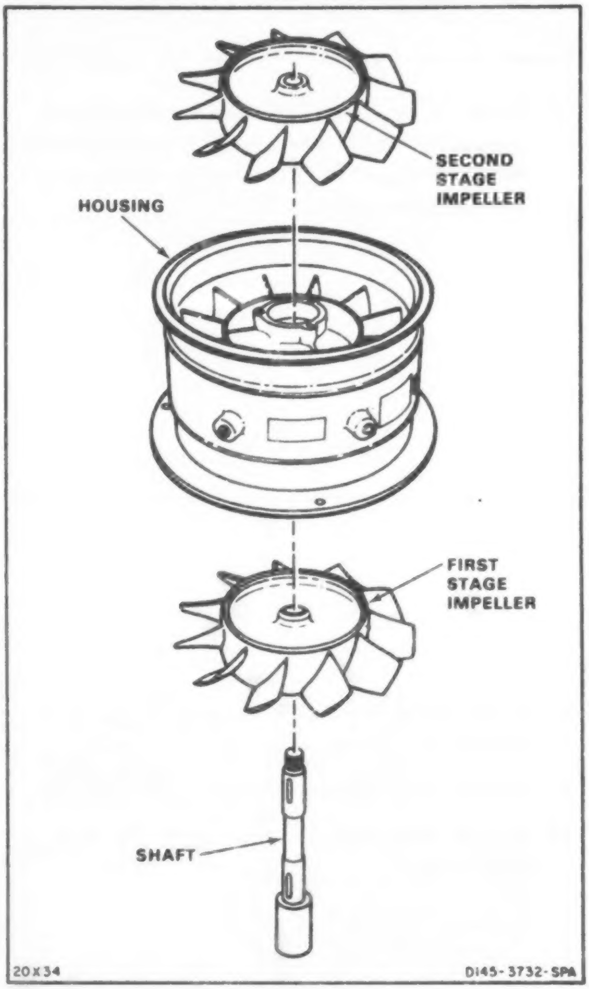


FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-184 ASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) 6-184



INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
Gun Type Heater
Pyrometer
Kevlar Gloves (E187)
Arbor Press
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Wood Dowel, 3/4-Inch X 12 Inches
Drift, Brass or Aluminum
Hand Lubricating Gun
Goggles

***Materials:***

Cloth (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Grease (E190)
Lockwire (E227)
Zinc Chromate Primer (E291)
Teflon Tape (E399)

***Parts:***

Packing

***Personnel Required:***

Aircraft Powertrain Repairer
Inspector

***References:***

TM 55-1520-240-23P

***General Safety Instructions:***

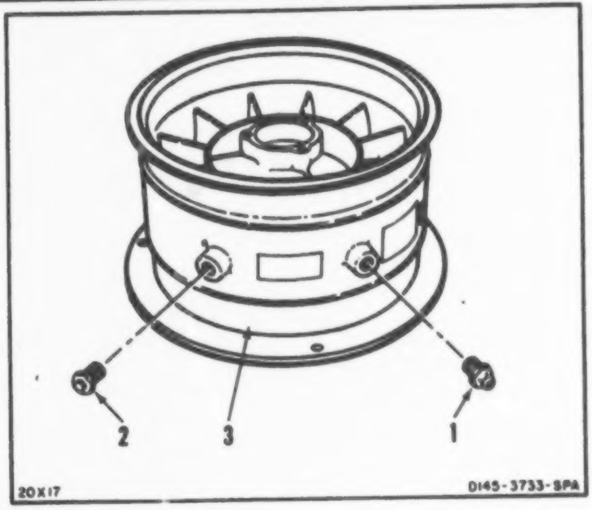
**WARNING**

**Zinc chromate primer (E291) and dry cleaning solvent (E162) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes . Get medical attention for eyes.**

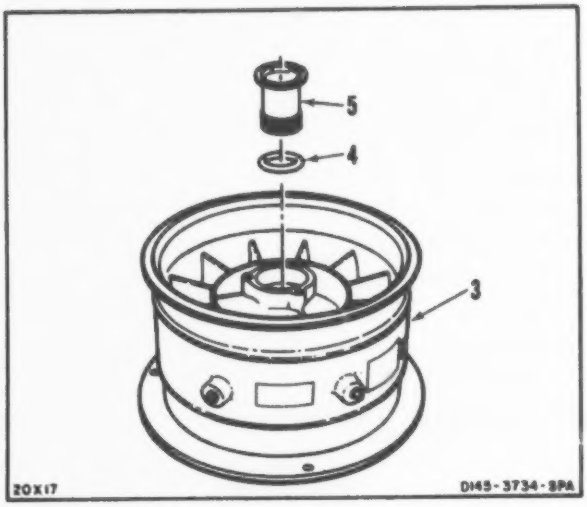
***GO TO NEXT PAGE***

## 6-184 ASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) (Continued)

1. Wrap Teflon tape (E399) around thread of grease fitting (1) and vent fitting (2). **Install fittings** in housing (3). **Torque fittings to 55 inch-pounds.**


2
3
1
20X17
D145-3733-SPA

2. Coat packing (4) with grease (E190). Install packing on grease sleeve (5).
3. Coat bore of housing (3) with grease (E190).
4. **Install sleeve (5)** in housing (3). Use soft faced mallet.


5
4
3
20X17
D145-3734-SPA

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## 6-184 ASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-184

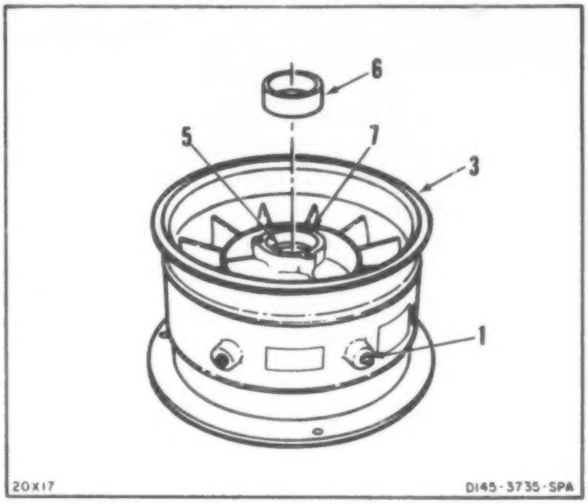
5. **Install bearing liner (6)** in housing (3) as follows:

**WARNING**

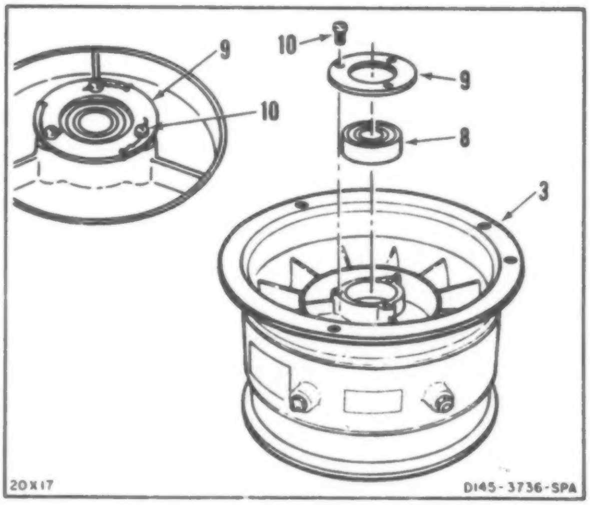
**Wear Kevlar gloves when handling heated parts.**

   a. Heat outlet end of bore in housing (3) to 230 to 250°F (110 to 130°C). Use heat gun. Wear Kevlar gloves (E187). Measure temperature with pyrometer.
   b. Coat outside of liner (6) with primer (E291).
   c. Press liner (6) into bore in housing (3).

6. Pump grease (E190) into grease fitting (1) until grease flows from three holes (7) in sleeve (5).



7. Turn housing (3) over 180 degrees .
8. Pack bearing (8) with grease (E190). **Install bearing,** seal end out, in bore in bottom of housing (3). Use brass or aluminum drift and mallet.
9. **Install retainer (9)** and three screws (10). **Torque screws to 20 inch-pounds .** Lockwire screws to retainer with lockwire (E227).



***INSPECT***

***GO TO NEXT PAGE***

## 6-184 ASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) (Continued)

10. **Install key (11)** in slot (12) in shaft (13).

**CAUTION**

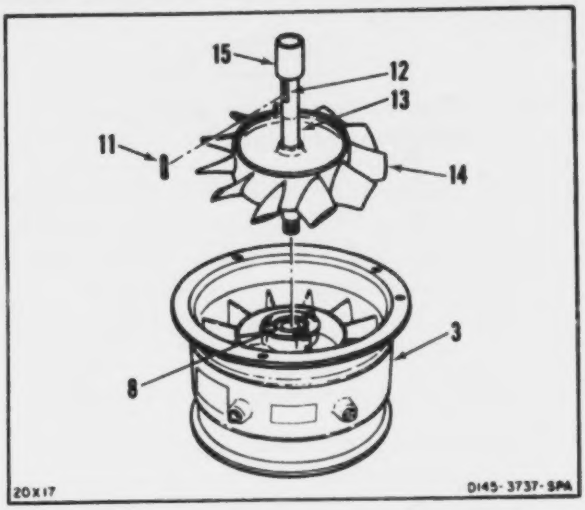
**If impeller is installed upside down, fan will not operate correctly. Transmission will overheat.**

11. Apply light coat of grease (E190) to shaft (13). **Install first-stage impeller (723018) (14) on shaft** over key (11), part number facing away from shoulder (15) and vanes angled down to left.

**NOTE**

Part number is stamped on one face of impeller hub.

12. **Install shaft (13) and impeller (14)** in flanged end of housing (3). Install shaft just far enough to extend through bearing (8).



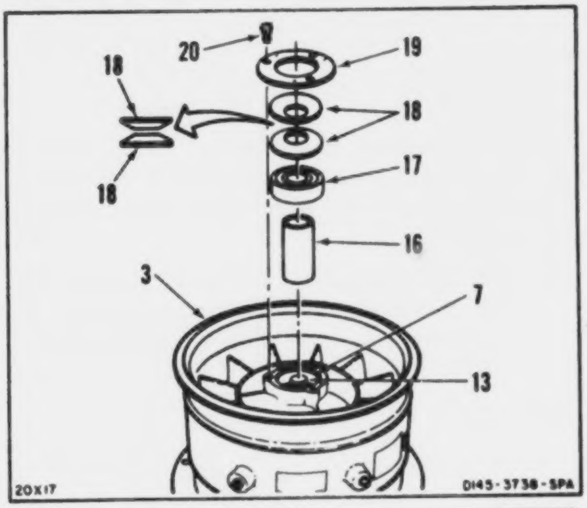
13. Turn housing (3) over 180 degrees.

14. Apply heavy coat of grease (E190) to outside of spacer (16). **Install spacer on shaft (13)** through outlet side of housing (3).

15. Pack bearing (17) with grease (E190). **Install bearing** in liner (7), seal end away from spacer (16). Use brass or aluminum drift.

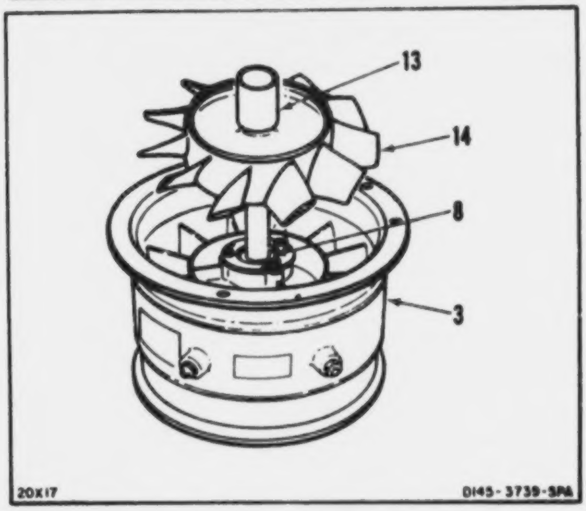
16. Coat two spring washers (18) with grease (E190). Position spring washers on bearing (17), small ends against each other.

17. **Position retaining plate (19)** over washers (18). **Loosely install three screws (20)** to hold plate.



18. Turn housing (3) over 180 degrees.

19. **Tap shaft (13) completely into housing (3).** Use soft-faced mallet. Check that impeller (14) is seated against bearing (8).



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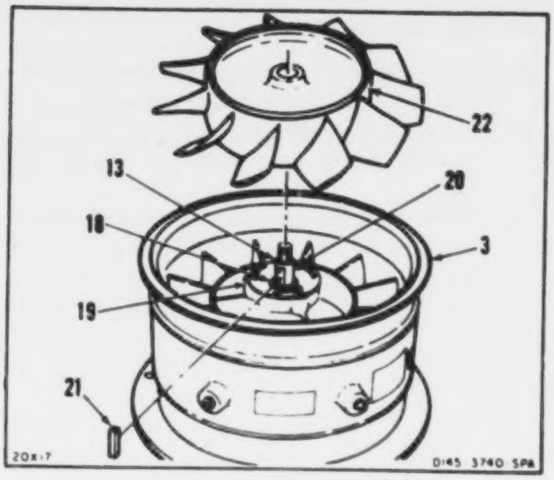
## 6-184 ASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-184

20. Turn housing (3) over 180 degrees.
21. Check location of two spring washers (18). They shall be centered around shaft (13) at outlet end of housing (3). **Torque three screws (20)** to 20 inch-pounds.
22. Lockwire screws (20) to holes in retainer (19). Use lockwire (E227).
23. Install key (21) in shaft (13).



**CAUTION**

**If impeller is installed upside down, fan will not operate correctly. Transmission will overheat.**

24. Apply light coat of grease (E190) to shaft (13). **Install second stage impeller (723020) (22)** on shaft over key (21), part number away from housing (3) and vanes angled up to right. Check that impeller is against spring washers (18).

**NOTE**

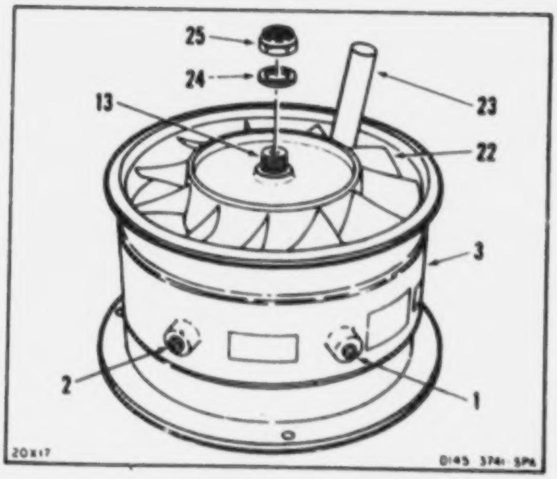
Part number is stamped on one face of impeller.

25. Clean thread of shaft (13) with dry cleaning solvent (E162) and cloths (E120). Wear goggles for eyes. Wear gloves (E186).

**NOTE**

Wood dowel keeps impeller from turning when torquing nut.

26. Install wood dowel (23) between vanes of impeller (22) and housing (3).
27. **Install** washer (24) and **nut (25)** on shaft (13). **Torque nut to 400 inch-pounds.**
28. Remove dowel (23).



**CAUTION**

**Do not overgrease. Do not block vent fitting (2). Stop grease application as soon as clean grease comes out of vent fitting.**

29. Pump grease (E190) into grease fitting (1) until grease comes out of vent fitting (2). Wipe off excess grease. Use cloth (E120).

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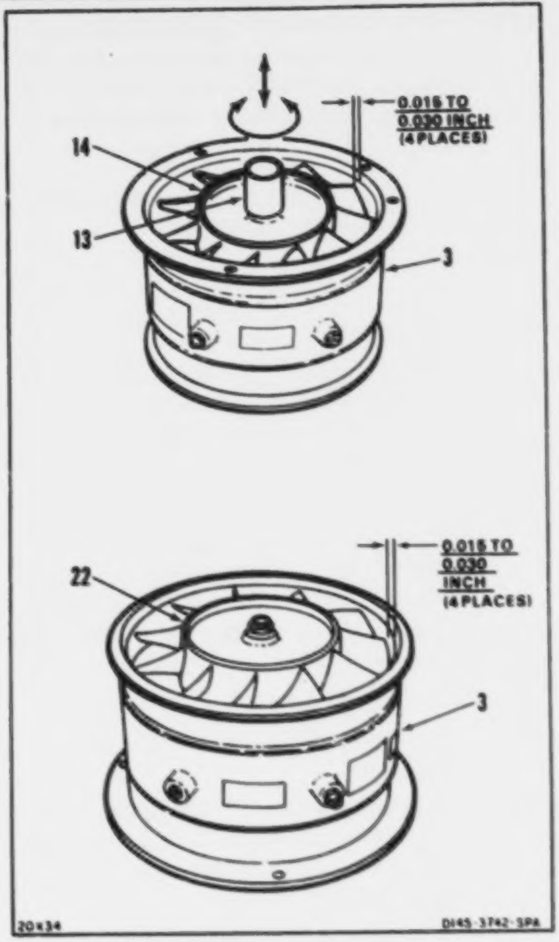
## 6-184 ASSEMBLE COMBINING TRANSMISSION OIL COOLER FAN (AVIM) (Continued) 6-184

### *CHECK ASSEMBLY*

30. **Turn fan shaft (13)** by hand several turns. There shall be no binding or noise.
31. **Try to move shaft (13)** in and out of housing (3). Free play in shaft shall not exceed 0.010 inch.
32. **Measure gap between vanes of impellers (14 and 22) and side of housing (3)** at four places, 90 degrees apart, around housing. Gap shall be 0.015 to 0.030 inch.

### *INSPECT*


0.015 TO 0.030 INCH (4 PLACES)
14
13
3
0.015 TO 0.030 INCH (4 PLACES)
22
3
20x34
D145-3742-3PA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-185 INSPECT COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SNUBBER 6-185

INITIAL SETUP

*Applicable Configurations:*
All

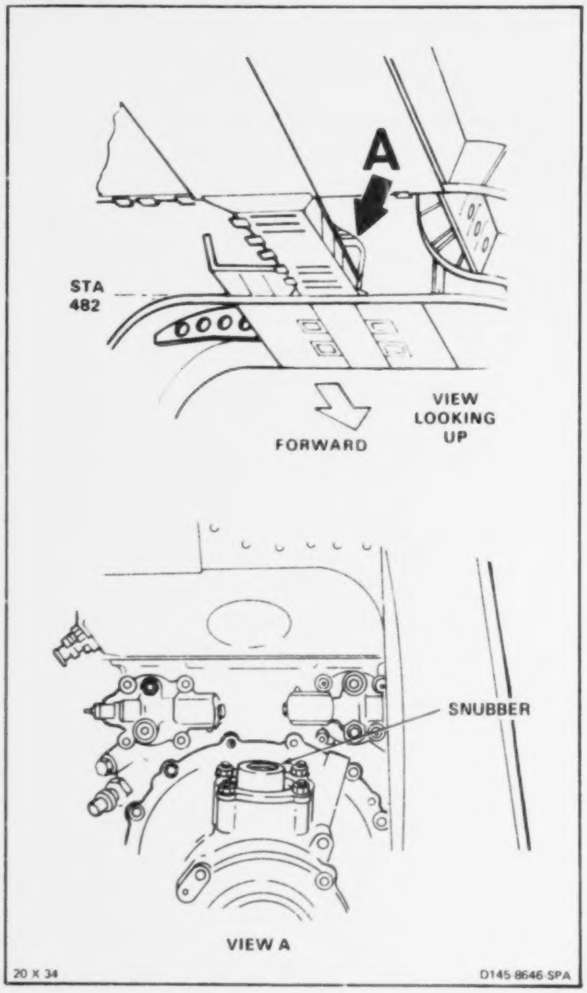
*Tools:*
Workstand

*Materials:*
None

*Personnel Required:*
67U10 Medium Helicopter Repairer
67U30 Inspector

*References:*
TM 55 1520 240 23P

*Equipment Condition:*
Battery Disconnected (Task 1-39)
Electrical Power Off
Combining Transmission Oil Cooler Fan and Drive Shaft Removed (Task 6-182)
Cargo Ramp Open and Level (TM 55-1520-240-T)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SNUBBER
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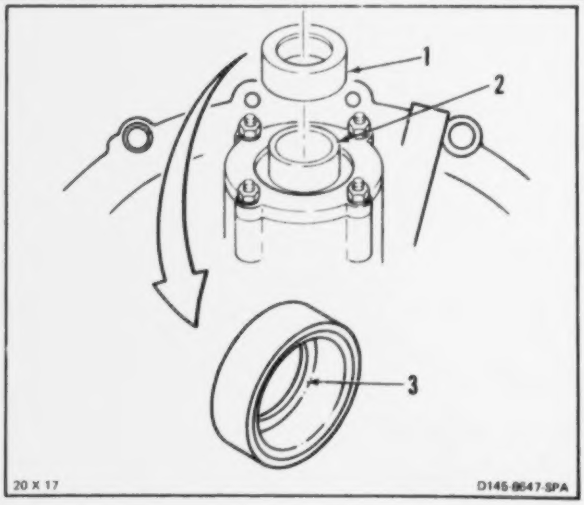
D145 8646 SPA

1. **Lift snubber (1)** from around end of output shaft (2).
2. **Check snubber (1)** for cuts, tears, and erosion of seating surface (3). There shall be no such damage.
3. **Install snubber (1)** over end of output shaft (2). Make sure snubber is fully seated.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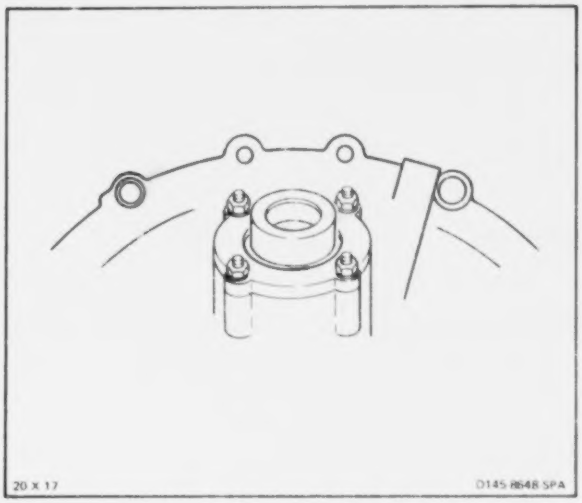
## 6-185 INSPECT COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SNUBBER (Continued) 6-185

FOLLOW-ON MAINTENANCE:

Install combining transmission oil cooler fan drive shaft and fan (Task 6-186).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 6-186

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Hand Lubricating Gun

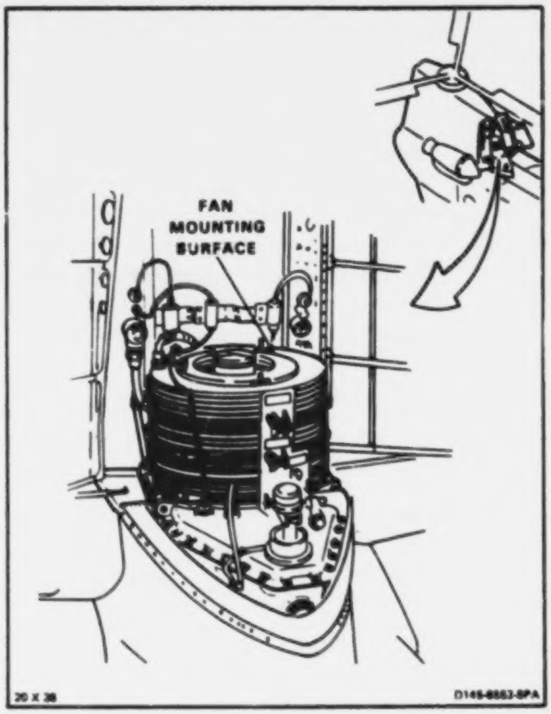
***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Grease (E190)
Gloves (E186)
Oil (E254)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Combining Transmission Oil Cooler Fan Drive Shaft Snubber Inspected (Task 6-185)
Combining Transmission Oil Cooler Fan Assembly and Fan Drive Shaft Inspected (Task 6-182.1).



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## 6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT (Continued) 6-186

1. Check the torque of the fan retaining nut. **Torque nut to 400 inch-pound.**

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

1.1 Clean splines (1) at each end of shaft (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.

2. Coat packings (3) with grease (E190). Pack splines (1) and cavity at each end of shaft (2) with grease.

**CAUTION**

**Ensure spline cavity in fan and in the combining transmission are packed 3/4 full of grease (E190).**

**CAUTION**

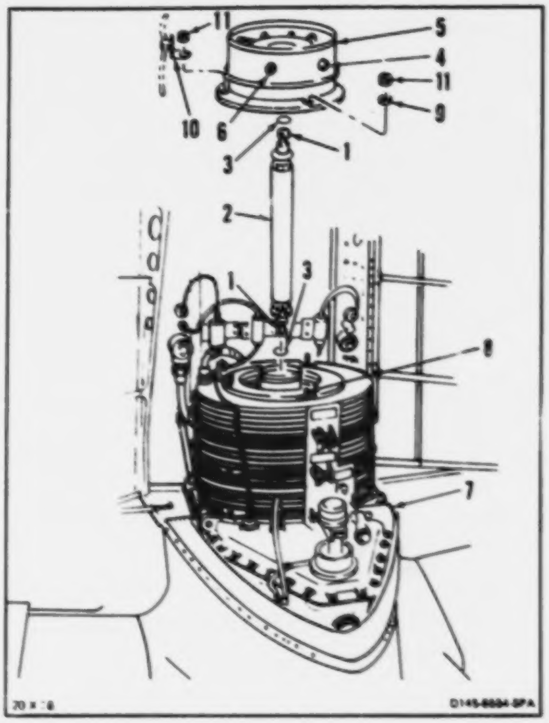
**Do not overgrease. Do not block vent fitting (5). Stop grease application as soon as clean grease comes out of vent fitting.**

3. Pump grease (E190) into grease fitting (4) of fan (5) until grease comes out of vent fitting (6). Pack splines of fan with grease. Wipe off excess grease with cloth (E120).

4. **Install shaft (2)** with marked upper end into fan (5). Wipe off excess grease with cloth (E120).

5. **Install shaft (2)** in transmission (7). Turn shaft as needed to engage splines. **Install fan (5)** on four studs (8).

6. **Install** three washers (9) and **bracket (10)** on four studs (8). Install four nuts (11). **Torque nuts to 120 inch-pounds.**



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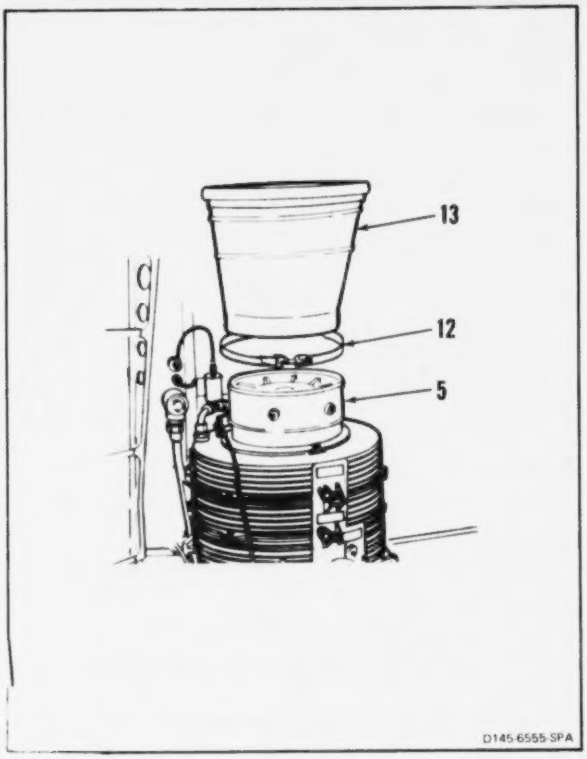
## 6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT (Continued) 6-186

7. Coat thread of clamp (12) with oil (E254). **Install clamp and duct (13)** on fan (5). **Torque clamp to 35 inch-pounds.**

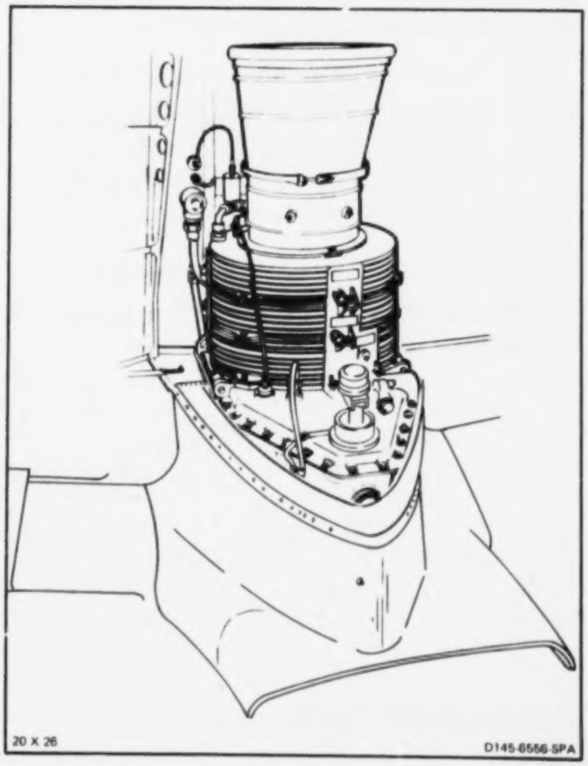

13
12
5
D145-6555-SPA

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).


20 X 26
D145-6556-SPA

**END OF TASK**

## 6-187 REMOVE COMBINING TRANSMISSION OIL COOLER 6-187

INITIAL SETUP

***Applicable Configurations:***
All

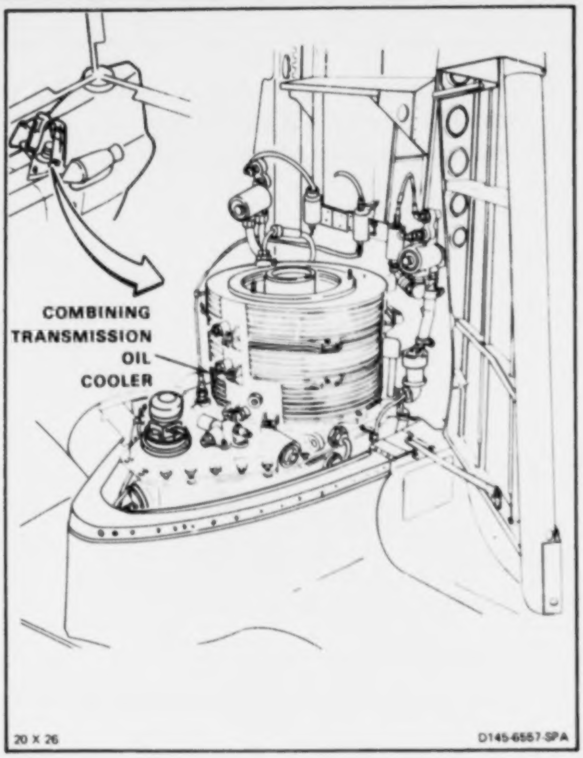
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Container, 2-Quart
Hose, 1-Inch ID, 36-Inches Long
Funnel

***Materials:***
Cloths (E120)
Paper Tags (E264)

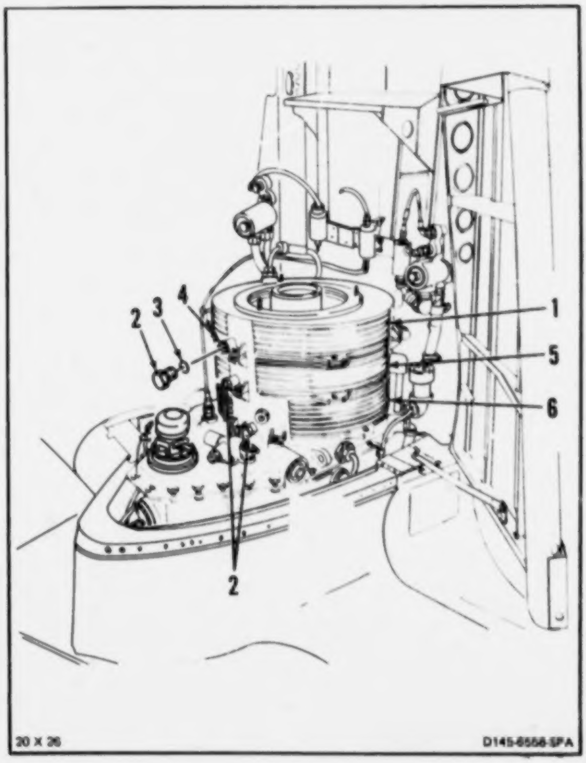
***Personnel Required:***
67U10 Medium Helicopter Repairer

***Parts:***
Packings (3)

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)



1. **Drain oil cooler (1)** as follows:
   a. Remove lockwire from drain plug (2).
   b. Remove drain plug (2) and packing (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
   c. Install drain plug (2) and packing (3).
2. **Repeat steps 1.a. through 1.c. for oil coolers (5 and 6).**



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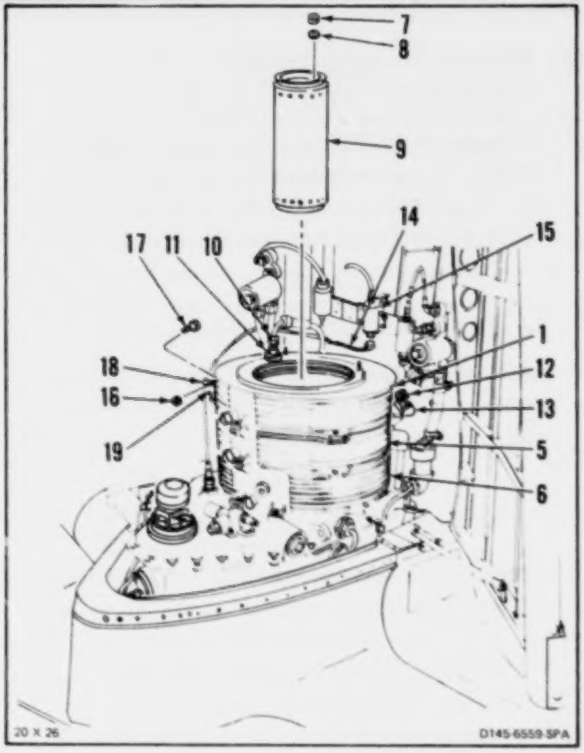
# 6-187 REMOVE COMBINING TRANSMISSION OIL COOLER (Continued) 6-187

3. **Remove four nuts (7) and washers (8)** from baffle (9). **Remove baffle.**
4. Tag and **disconnect oil hose (10)** from reducer (11) on top cooler (1).
5. Tag and **disconnect oil hose (12)** from elbow (13) on middle cooler (5).
6. **Disconnect oil hose (14)** from oil pressure transmitter (15).
7. **Remove** nut (16) and **bolt (17)** securing clamp (18) to bracket (19).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8. **Remove** nuts (20), washers (21), and **bolts (22)** from three places around inside of middle cooler (5).
9. **Remove** nuts (23), washers (24), and **bolts (25)** from six places around outside of middle cooler (5).

**NOTE**

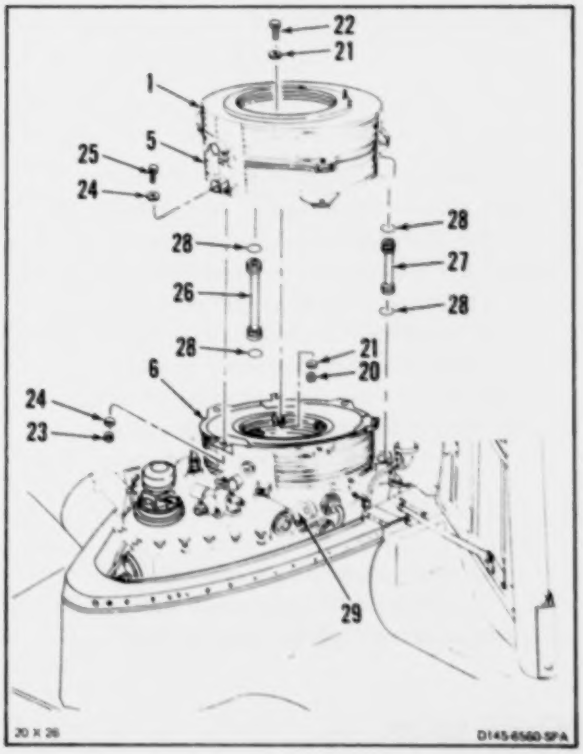
Do not tilt coolers. Oil can spill.

10. **Lift coolers (1 and 5) straight up and away** from cooler (6) and two oil transfer tubes (26 and 27).

**NOTE**

Transfer tubes may stay in coolers.

11. **Remove two oil transfer tubes (26 and 27)** and four packings (28) from sump cover (29).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## 6-187 REMOVE COMBINING TRANSMISSION OIL COOLER (Continued) 6-187

12. **Remove six nuts (30)** and washers (31) from around inside of cooler (6).

13. **Remove** nuts (32), washers (33), and **bolts (34)** at four places around aft part of cooler (6). Remove three nuts (35) and washers (36) from forward edge of cooler.

**NOTE**

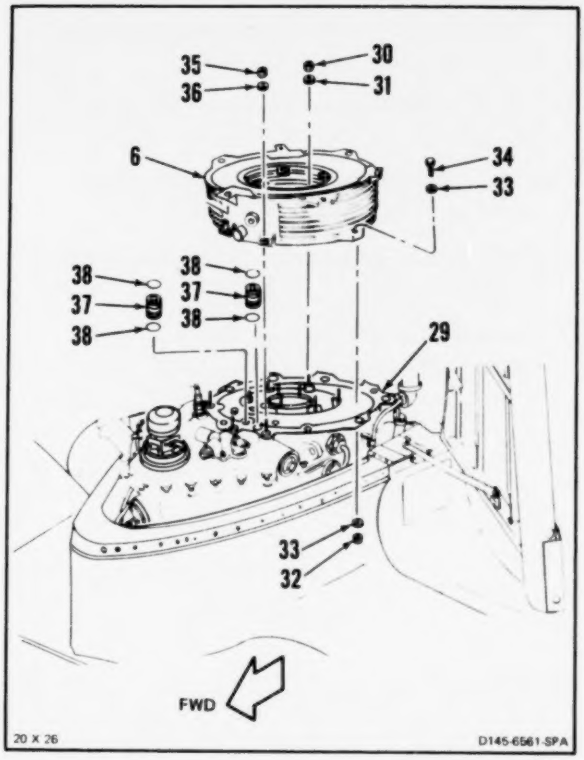
Do not tilt cooler. Oil can spill.

14. **Lift cooler (6) straight up and away** from sump cover (29) and two oil transfer tubes (37).

**NOTE**

Transfer tubes may stay in cooler.

15. **Remove two transfer tubes (37)** and four packings (38).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FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-187.1 REPAIR COMBINING TRANSMISSION OIL COOLER OUTSIDE SURFACE 6-187.1

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Dial Indicating Depth Gage 643J
Goggles

***Materials:***
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Epoxy Primer (E293)
Black Lacquer Topcoat (E215)

***Personnel Required:***
Aircraft Powertrain Repairer
Inspector

***References:***
TM 43-0103
MIL-C-5541
MIL-C-22751

***Equipment Condition:***
Off Helicopter Task

***General Safety Instructions:***

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

***GO TO NEXT PAGE***

## 6-187.1 REPAIR COMBINING TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued) 6-187.1

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

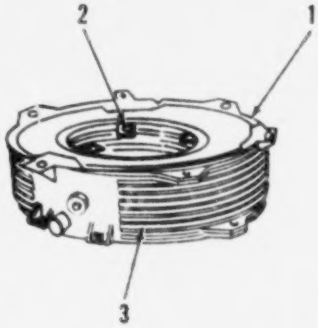
1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cooler (1).

**NOTE**

Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**
   b. **Damage shall not extend over more than one surface or enter any radius.**
   c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**
   d. **More than 3 inches of fins (3) shall not be crushed beyond straightening.**
   e. **If any fin is bent more than 30 degrees, straighten it.**

3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



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## 6-187.1 REPAIR COMBINING TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued) 6-187.1

6. Acid-etch reworked area as follows:

   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**

   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**

   c. **Rinse area with cold water.**

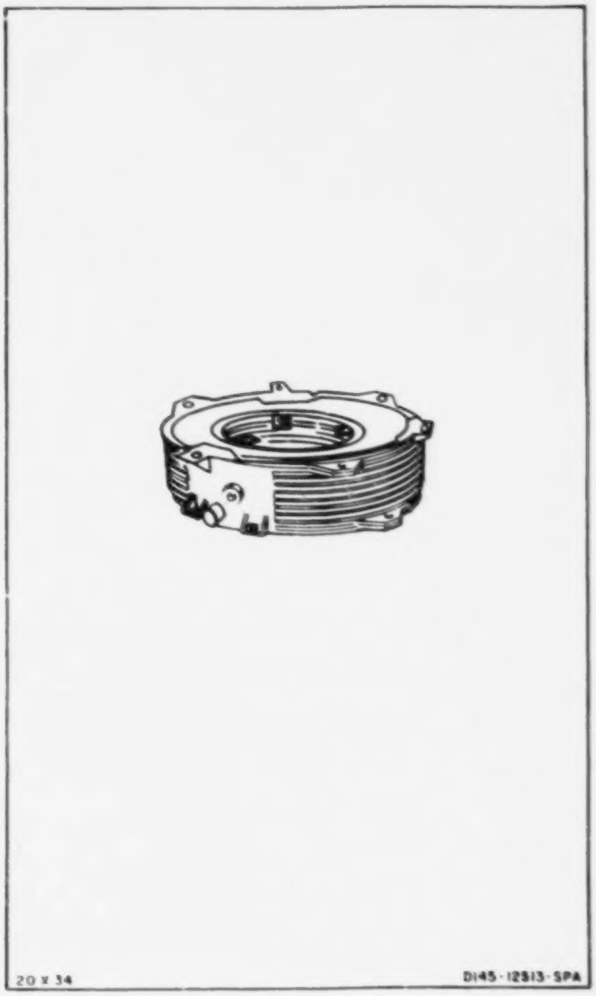
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**

8. **Clean** reworked area **with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.

9. **Swab on solution of alodine powder (E65) and water (MIL-C-5541). Use gauze sponges (E184). Swab for 2 to 5 minutes. Rinse area** with cold water and let air dry.

10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.

11. **Apply black lacquer topcoat (E215)** (MIL-C-22751).



***INSPECT***

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-188 INSTALL COMBINING TRANSMISSION OIL COOLER 6-188

INITIAL SETUP

***Applicable Configurations:***
All

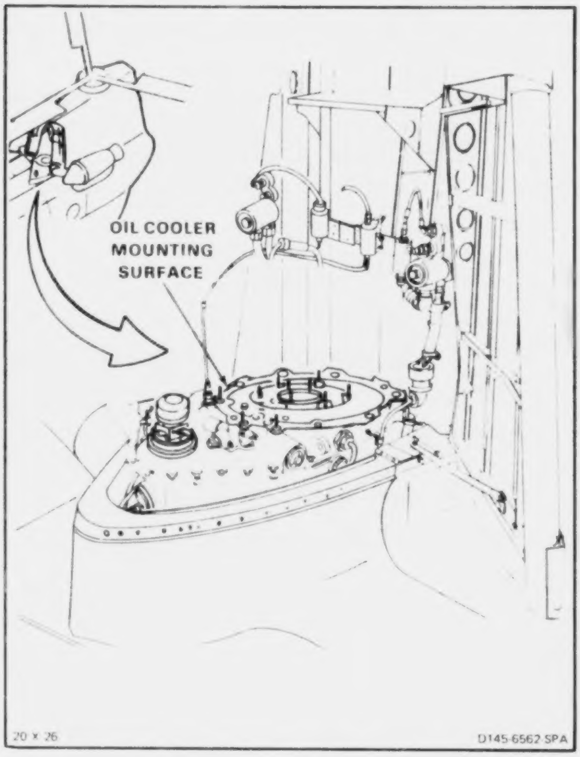
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Open End Wrench, 1 1/2-Inch

***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

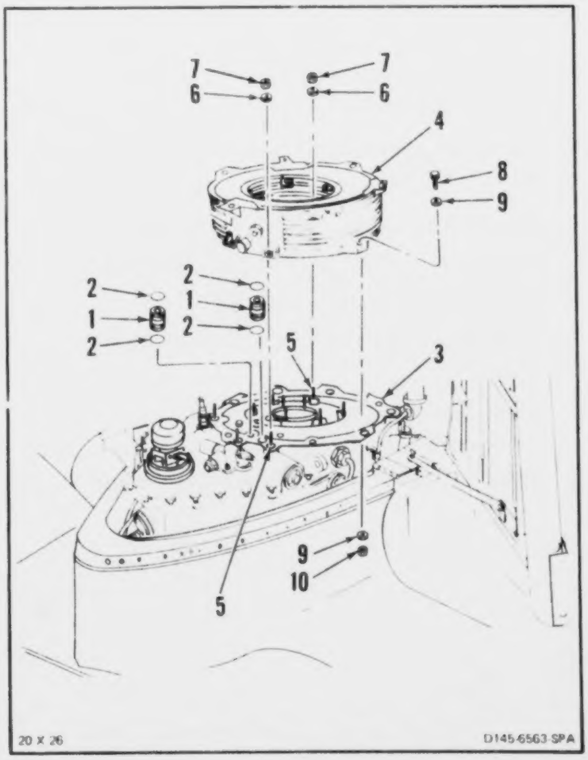


1. **Install two oil transfer tubes (1)** and four packings (2) in sump cover (3).

**NOTE**

Do not tilt cooler. Oil can spill.

2. **Install cooler (4)** on two transfer tubes (1) and nine studs (5). Press down firmly to seat cooler on tubes.
3. **Install** washers (6) and **nuts (7)** at six places around inside of cooler (4). Install washers and nuts at three places around outside of cooler. **Torque nuts to 60 inch-pounds.**
4. **Install bolts (8),** washers (9), and nuts (10) at four places around outside of cooler (4). **Torque nuts to 60 inch-pounds.**



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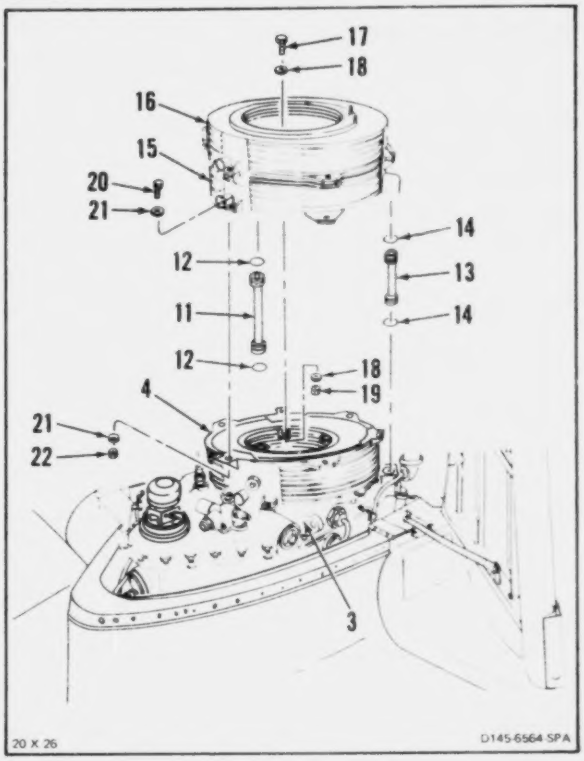
## 6-188 INSTALL COMBINING TRANSMISSION OIL COOLER (Continued) 6-188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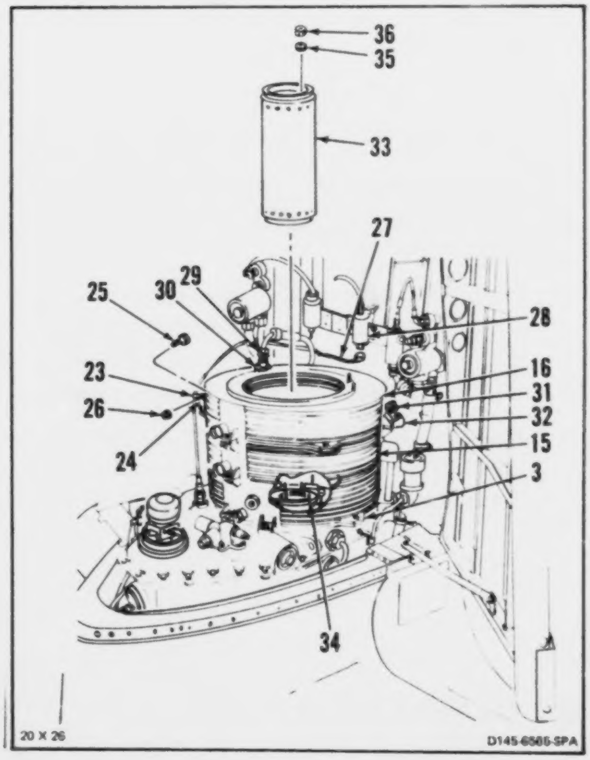
5. **Install oil transfer tube (11)** and two packings (12) in aft left corner of sump cover (3). **Install oil transfer tube (13)** and two packings (14) in aft right corner of sump cover.

**NOTE**

Do not tilt coolers. Oil can spill.

6. **Install coolers (15 and 16)** over cooler (4) and on two transfer tubes (11 and 13). Press down firmly to seat coolers on tubes.
7. **Install bolts (17),** washers (18) and nuts (19) at three places around inside of cooler (15). **Torque nuts to 60 inch-pounds.**
8. **Install bolts (20),** washers (21) and nuts (22) at six places around outside of cooler (15). **Torque nuts to 60 inch-pounds.**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D145-6565-SPA

9. **Position clamp (23)** against bracket (24). **Install bolt (25)** and nut (26).
10. **Connect oil hose (27)** to oil pressure transmitter (28).
11. Coat thread of hose (29) with oil (E254). Connect hose to reducer (30) on cooler (16).
12. Coat thread of hose (31) with oil (E254). **Connect hose to elbow (32) on cooler (15).**
13. **Install baffle (33)** on four studs (34) on sump cover (3). Install washers (35) and nuts (36). **Torque nuts to 60 inch-pounds.**

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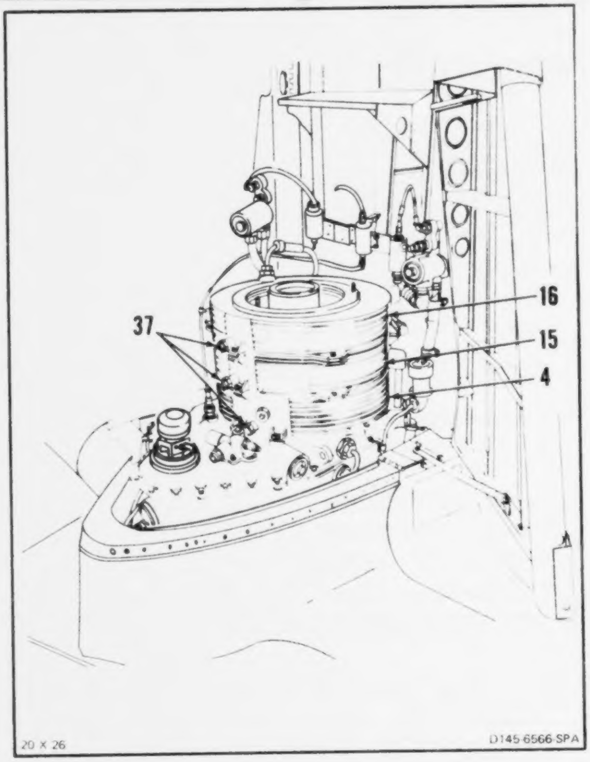
## 6-188 INSTALL COMBINING TRANSMISSION OIL COOLER (Continued) 6-188



14. Lockwire three drain plugs (37) to oil cooler (4, 15, and 16). Use lockwire (E231).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

Perform ground run (TM 55-1520-240-10).

**END OF TASK**

## 6-189 REMOVE COMBINING TRANSMISSION SUMP 6-189

INITIAL SETUP

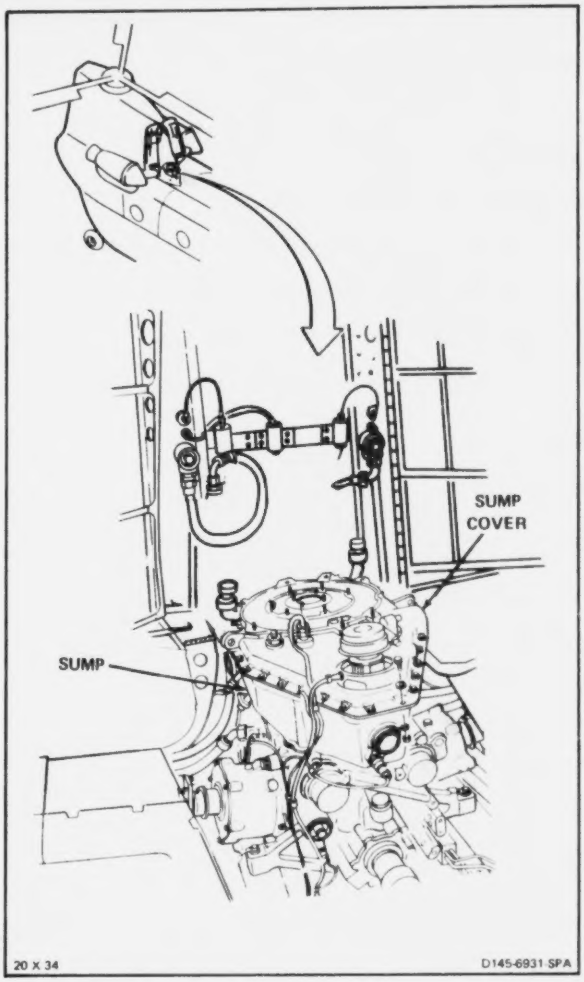
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

***Materials:***
Paper Tags (E264)
Barrier Material (E80)
Tape (E388)

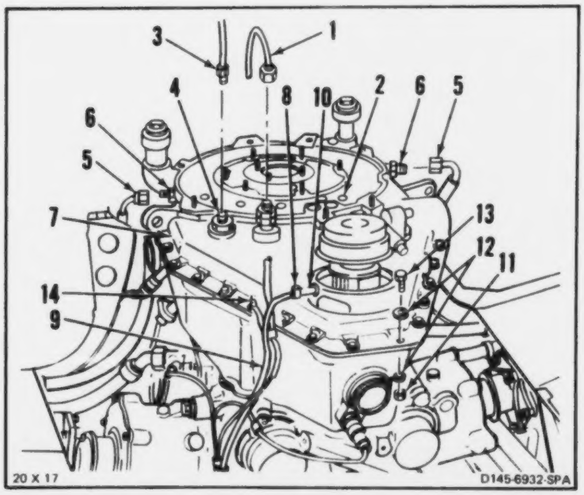
***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Doors Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)
Combining Transmission Oil Cooler Removed (Task 6-187)
Aft Pylon Lower Fairing Removed (Task 2-2)
Sump Drained (Task 6-168)



### REMOVE SUMP COVER

1. Tag and **disconnect electrical connector (1)** from oil pressure switch (2).
2. **Disconnect oil hose (3)** from union (4).
3. **Disconnect breather hose (5)** from reducer (6) on each side of sump cover (7).
4. Loosen drainline clamp (8). **Disconnect drainline (9)** from nipple (10).
5. **Remove** nuts (11) washers (12), and **bolts (13)** from 23 places around sump cover (7). Keep clip (14) with drainline (9).



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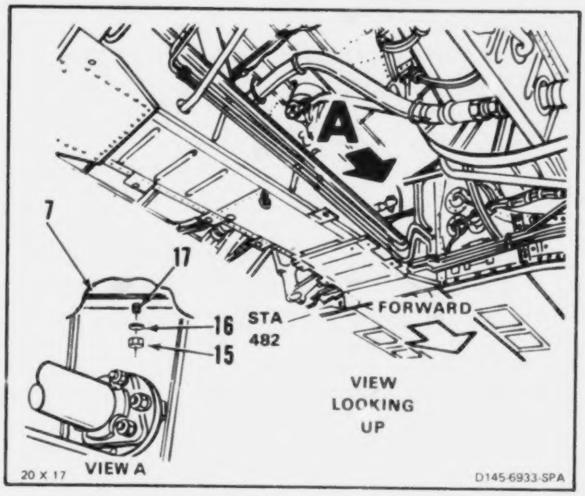
## 6-189 REMOVE COMBINING TRANSMISSION SUMP (Continued) 6-189

6. From inside helicopter, **remove nuts (15)** and washers (16) from eight studs (17) at aft edge of cover (7).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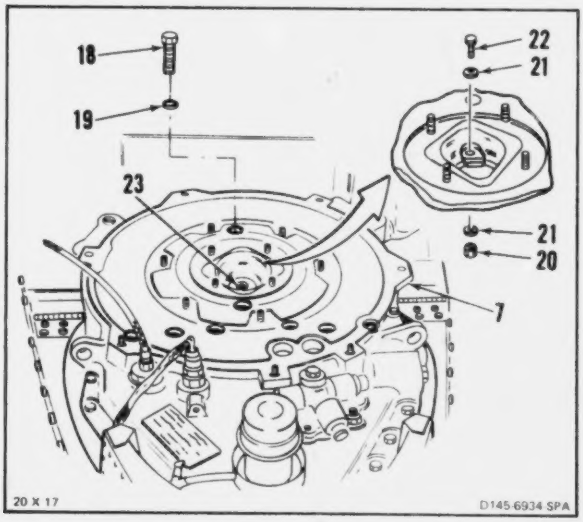
7. **Remove eight bolts (18)** and washers (19) from top of sump cover (7). **Remove two** nuts (20), washers (21) and **bolts (22)** inside fan shaft hole (23).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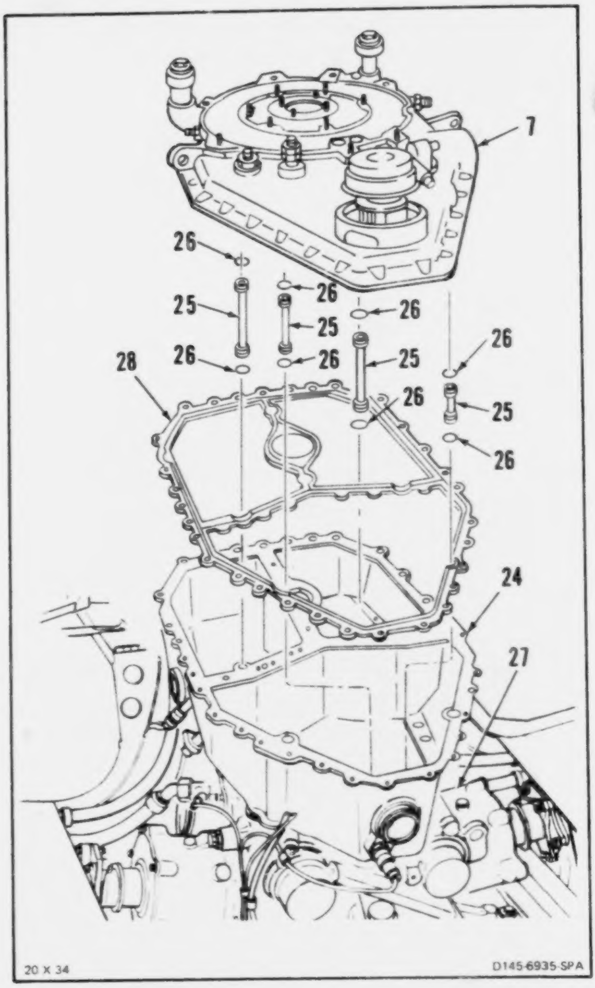
## 6-189 REMOVE COMBINING TRANSMISSION SUMP (Continued) 6-189

8. Lift cover (7) straight up from sump (24). **Remove cover.**

**NOTE**

Tubes may come off with cover or stay in transmission.

9. **Remove four oil transfer tubes (25)** and eight packings (26) from cover (7) or transmission (27). Remove packings (26) from tubes.
10. **Remove gasket seal (28).**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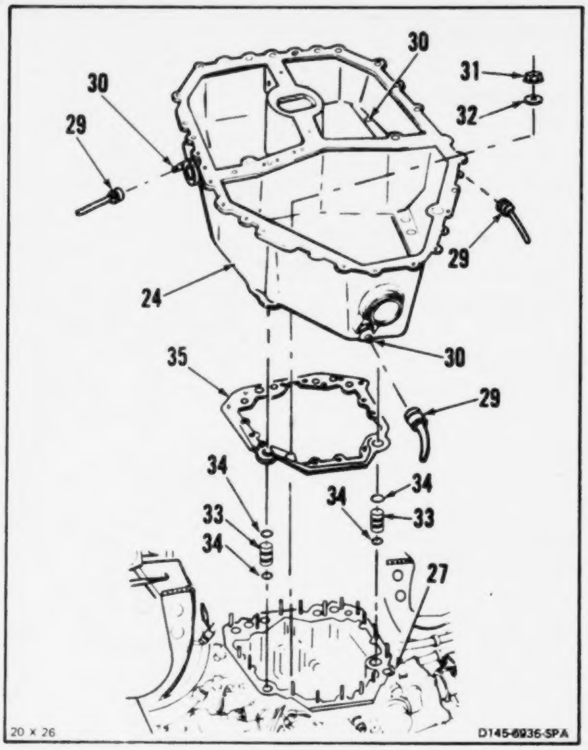
## 6-189 REMOVE COMBINING TRANSMISSION SUMP (Continued) 6-189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### *REMOVE SUMP*

11. Tag and **disconnect electrical connectors (29)** from three temperature bulbs (30).
12. **Remove 19 nuts (31)** and washers (32).
13. Lift sump (24) straight up from transmission (27). **Remove sump.**

**NOTE**

Tubes may come off with sump or stay in transmission.

14. **Remove two oil transfer tubes (33)** and four packings (34) from sump (24) or transmission (27).
15. Remove gasket seal (35).
16. Cover opening in transmission (27) with barrier material (E80) and tape (E388).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-190 DISASSEMBLE COMBINING TRANSMISSION SUMP 6-190

INITIAL SETUP

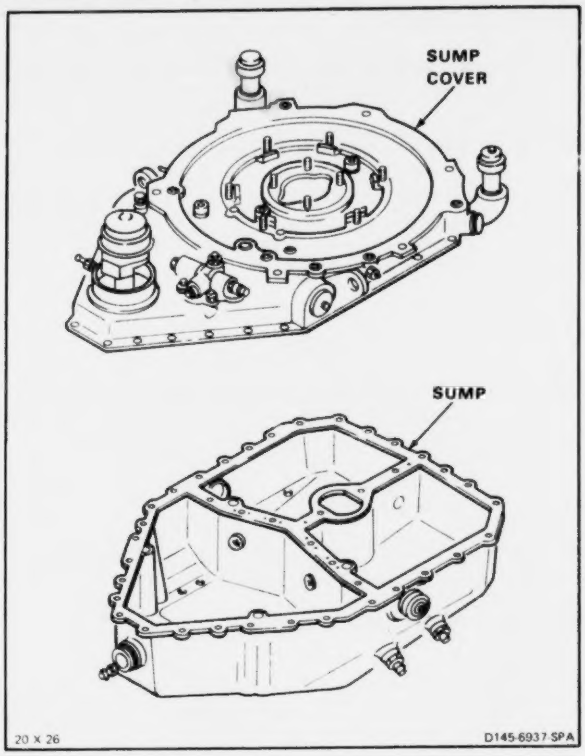
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Spanner Wrench
Open End Wrench, 1 3/8-Inch

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Off Helicopter Task


SUMP COVER
SUMP
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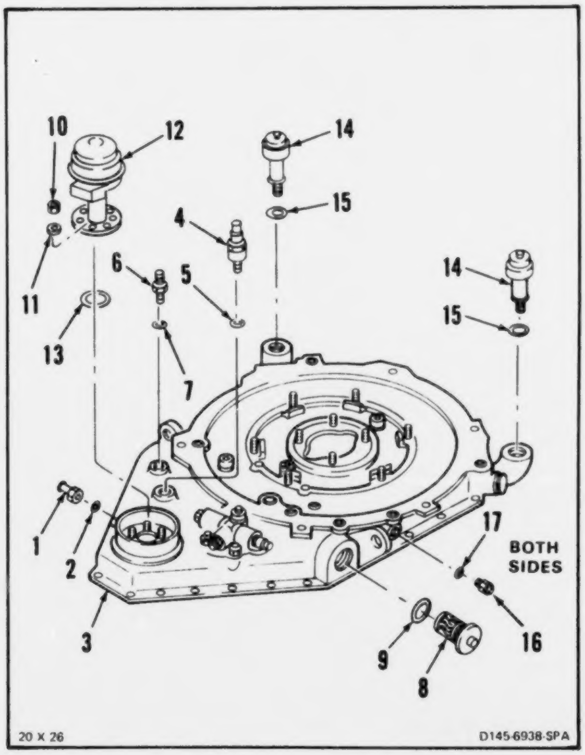
D145-6937-SPA

### *DISASSEMBLE SUMP COVER*

1. **Remove hose nipple (1)** and packing (2) from sump cover (3).
2. Remove lockwire from oil pressure switch (4). **Remove switch** and packing (5).
3. **Remove union (6)** and packing (7).
4. Remove lockwire from inlet screen (8). **Remove inlet screen** and packing (9).
5. Remove five nuts (10) and washers (11) from oil filler (12). **Remove oil filler** and packing (13).
6. Remove lockwire from two vents (14). **Remove vents** and packings (15).
7. **Remove reducer (16)** and packing (17) from each side of sump cover (3).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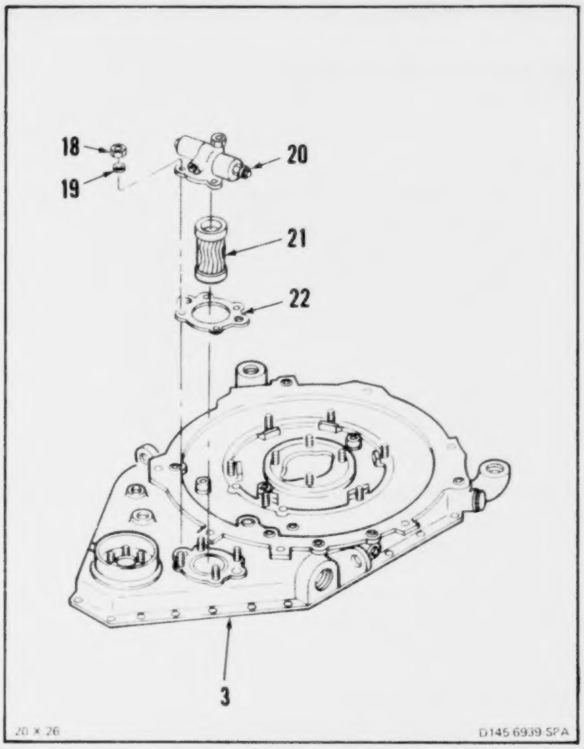
## 6-190 DISASSEMBLE COMBINING TRANSMISSION SUMP (Continued) 6-190

8. Remove four nuts (18) and washers (19) from filter housing (20). **Remove filter housing, element (21), and gasket seal (22)** from sump cover (3).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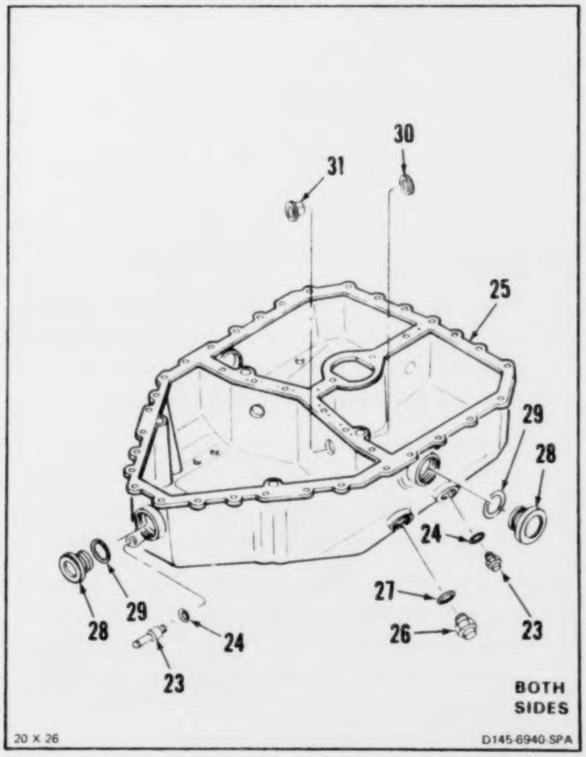
### *DISASSEMBLE SUMP*

9. Remove lockwire from three temperature probes (23). **Remove temperature probes** and packings (24) from sump (25).
10. Remove lockwire from two drain valves (26). **Remove drain valves** and packings (27).
11. Remove lockwire from three sight gages (28). **Remove sight gages** and packings (29). Use spanner wrench.
12. **Remove three** retaining rings (30) and **screens (31).**

FOLLOW-ON MAINTENANCE:

None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**END OF TASK**

## 6-191 ASSEMBLE COMBINING TRANSMISSION SUMP 6-191

INITIAL SETUP

***Applicable Configurations:***
All

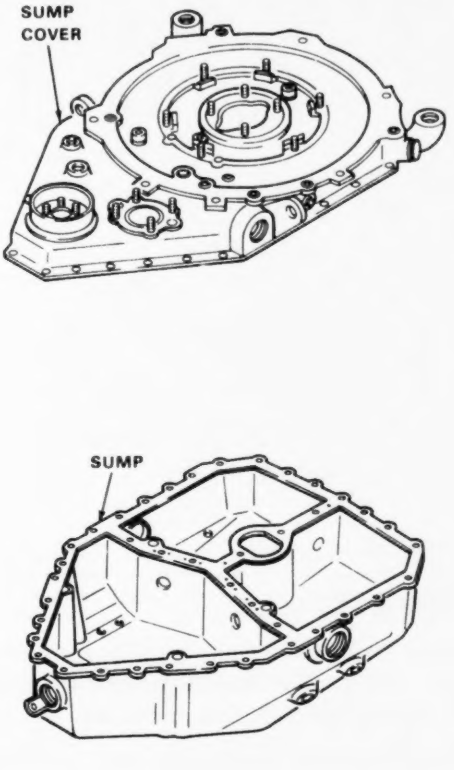
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Spanner Wrench
Deep Socket, 1 3/8-Inch

***Materials:***
Oil (E254)
Lockwire (E231)
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E186)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P



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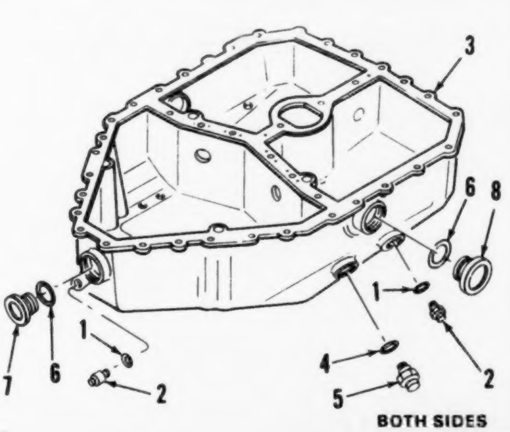
### *ASSEMBLE SUMP*

1. Coat packing (1) and thread of three temperature probes (2) with oil (E254). **Install packings** on probes. **Install probes** in sump (3). **Torque probes to 60 inch-pounds.**

2. Coat packing (4) and thread of two drain valves (5) with oil (E254). **Install packings** on drain valves. **Install drain valves** in sump (3). **Torque valves to 80 inch-pounds.**

3. Coat packings (6) and thread of sight gage (7) and two sight gages (8) with oil (E254). **Install packings** on sight gages. **Install sight gages** in sump. **Torque gages to 80 inch-pounds.** Use spanner wrench.



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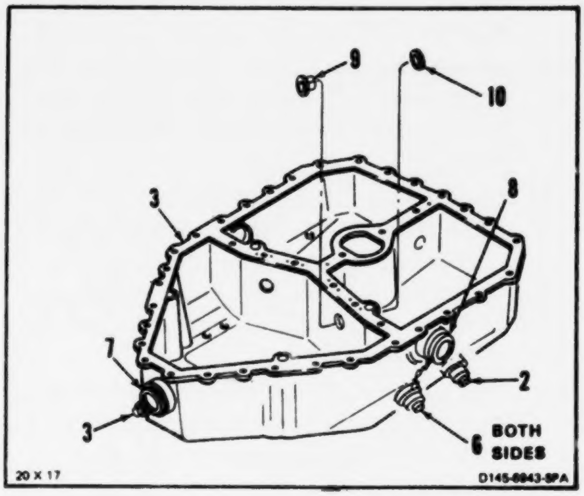
## 6-191 ASSEMBLE COMBINING TRANSMISSION SUMP (Continued) 6-191

4. Lockwire sight gage (7) at front of sump (3) to temperature probe (3). Lockwire two sight gages (8) at sides of sump to drain valves (6). Use lockwire (E231).
5. Lockwire two temperature probes (2) at sides of sump (3) to sump. Use lockwire (E231).
6. **Install three screens (9)** and retaining rings (10).



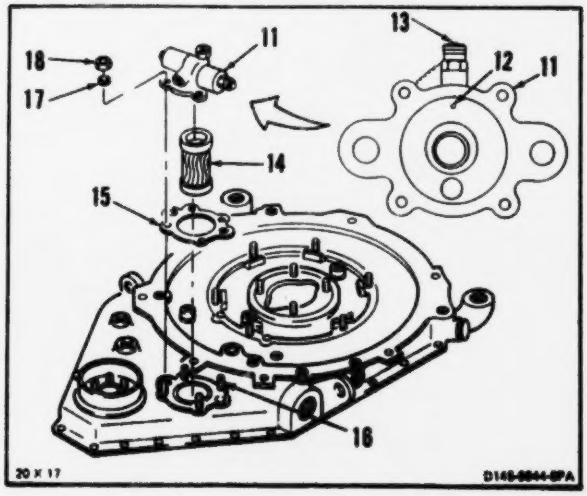
*INSPECT*

*ASSEMBLE SUMP COVER*

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

7. **Clean inside of filter housing (11)** with dry cleaning solvent (E162) and clean cloths (E120). Check that hole (12) is free of debris. Wear gloves (E186).
8. Hold housing (11) so that indicating button (13) points straight up. **Push in button** to lock it down.
9. **Install element (14)** in housing (11).
10. **Install gasket seal (15), and housing (11)** on four studs (16). Install four washers (17) and nuts (18). **Torque nuts to 60 inch-pounds.**



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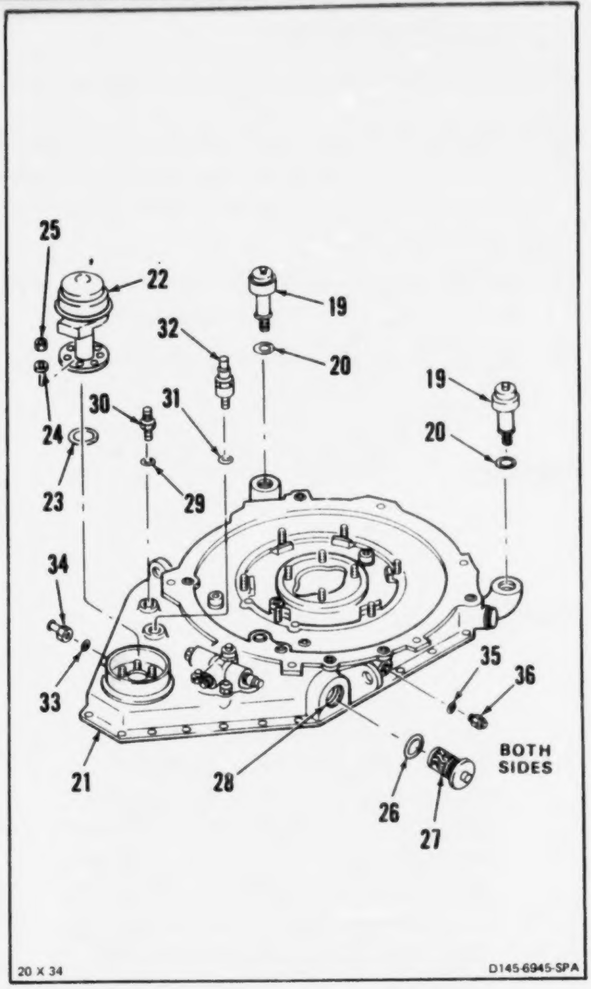
## 6-191 ASSEMBLE COMBINING TRANSMISSION SUMP (Continued) 6-191

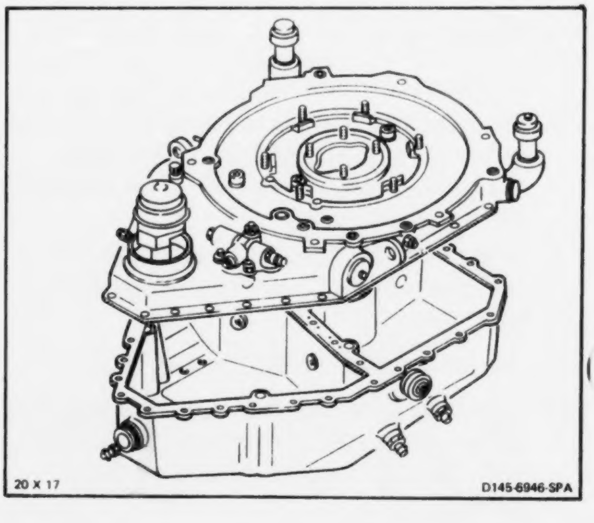
11. **Install two vents (19)** and packings (20). **Torque vents to 80 inch-pounds.** Lockwire vents to sump cover (21). Use lockwire (E231).
12. **Install oil filler (22)** and packing (23) on sump cover (21). Install five washers (24) and nuts (25). **Torque nuts to 60 inch-pounds.**
13. Coat packing (26) and thread of inlet screen (27) with oil (E254). **Install inlet screen** and packing in sump cover cavity (28). **Torque screen to 80 inch-pounds.** Lockwire screen to sump cover (21) with lockwire (E231).
14. Coat packing (29) and thread of union (30) with oil (E254). **Install union** and packing in cover (21). **Torque union to 80 inch-pounds.**
15. Coat packing (31) and thread of oil pressure switch (32) with oil (E254). **Install switch** and packing in cover (21). **Torque switch to 80 inch-pounds.** Lockwire switch to cover with lockwire (E231).
16. **Install** packing (33) and **hose nipple (34).**
17. Coat two packings (35) and thread of two reducers (36) with oil (E254). **Install reducers** and packings on each side of sump cover (21). **Torque reducers to 80 inch-pounds.**



***INSPECT***

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-192 INSTALL COMBINING TRANSMISSION SUMP 6-192

INITIAL SETUP

***Applicable Configurations:***
All

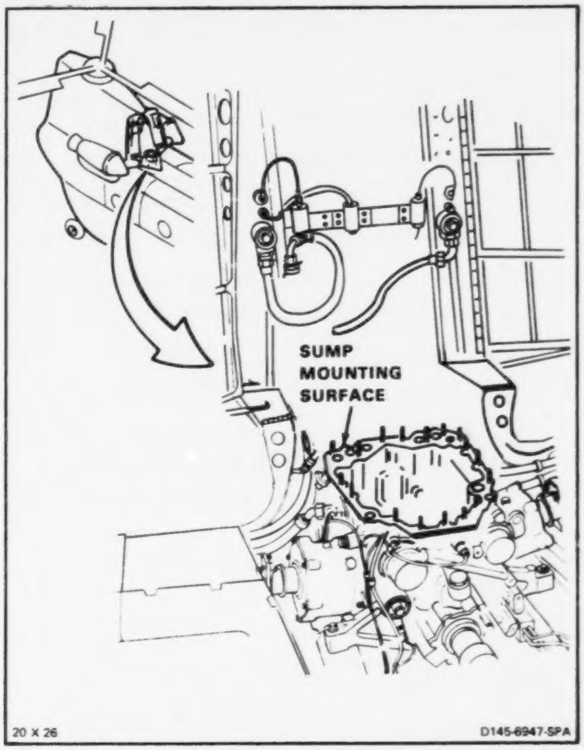
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
None

***Parts:***
Packings

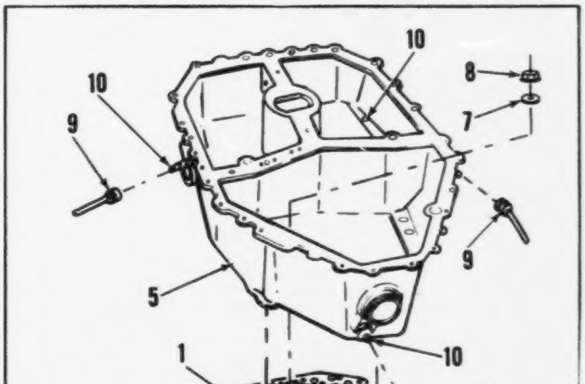
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P


SUMP
MOUNTING
SURFACE
20 X 26
D145-6947-SPA

### *INSTALL SUMP*

1. **Position gasket seal (1)** on transmission (2).
2. **Install four packings (3)** on two oil transfer tubes (4). **Install tubes** in transmission (2).
3. **Install sump (5)** on seal (1) and 19 studs (6).
4. **Install 19** washers (7) and **nuts (8)** on studs (6). **Torque nuts to 60 inch-pounds.**
5. **Connect three electrical connectors (9)** to temperature bulbs (10). Remove tags.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10
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5
10
1
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3
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4
4
3
3
6
2
20 X 26
D145-6948-SPA

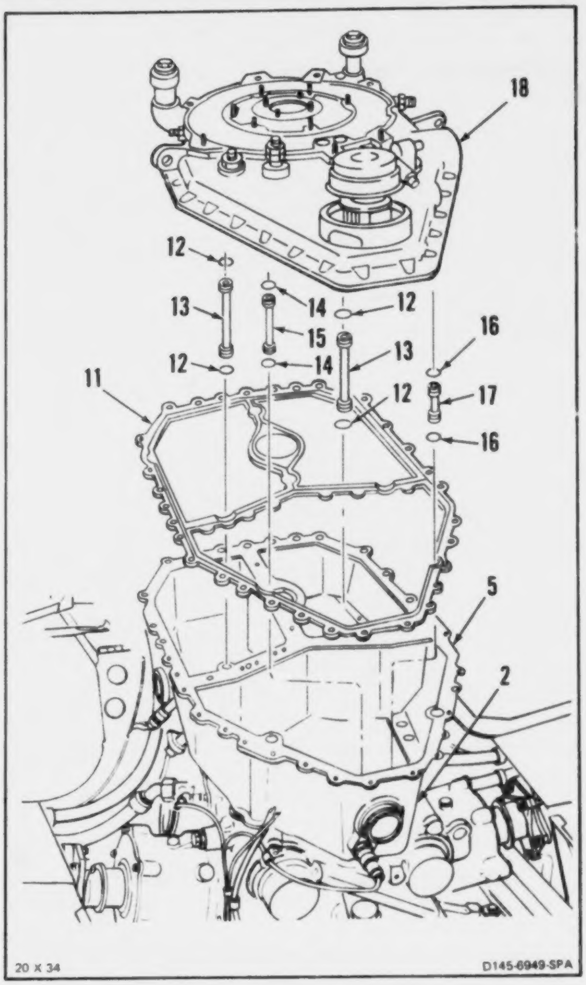
*GO TO NEXT PAGE*

## 6-192 INSTALL COMBINING TRANSMISSION SUMP (Continued) 6-192

*INSPECT*

*INSTALL SUMP COVER*

6. **Position gasket seal (11)** on sump (5).
7. Install four packings (12) on two oil transfer tubes (13). **Install tubes** in transmission (2).
8. Install two packings (14) on oil transfer tube (15). **Install tube** in transmission (2).
9. Install two packings (16) on oil transfer tube (17). **Install tube** in transmission (2).
10. Align sump cover (18) with four transfer tubes (13, 15, and 17). **Install cover** on sump (5). Make sure all tubes are firmly seated.



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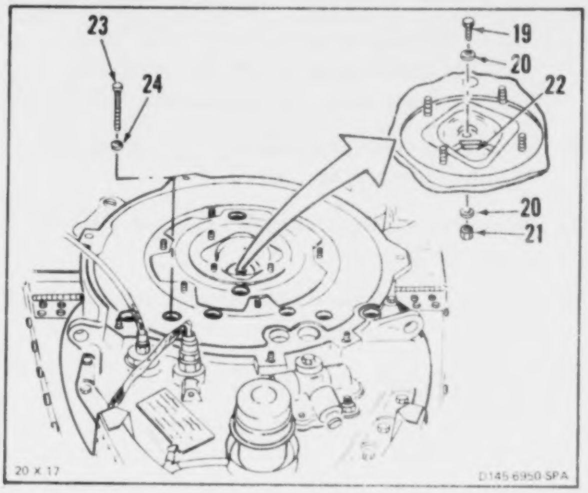
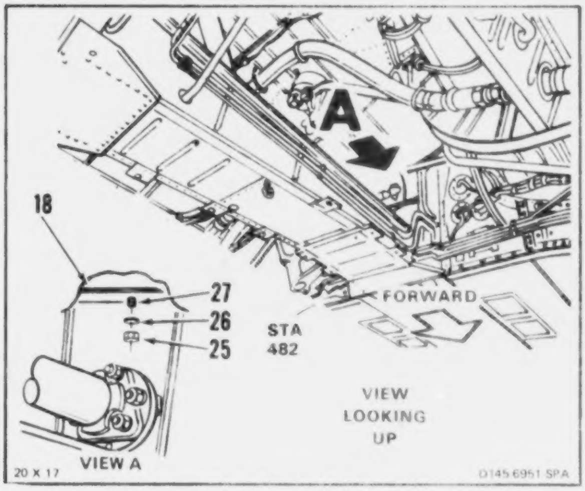
## 6-192 INSTALL COMBINING TRANSMISSION SUMP (Continued) 6-192

11. **Install bolts (19), washers (20) and nuts (21)** at two places inside fan shaft hole (22). **Torque nuts to 60 inch-pounds.**
12. **Install eight bolts (23)** and seal washers (24). **Torque bolts to 50 inch-pounds.**


23
24
19
20
22
20
21
20 x 17
D145 6950 SPA

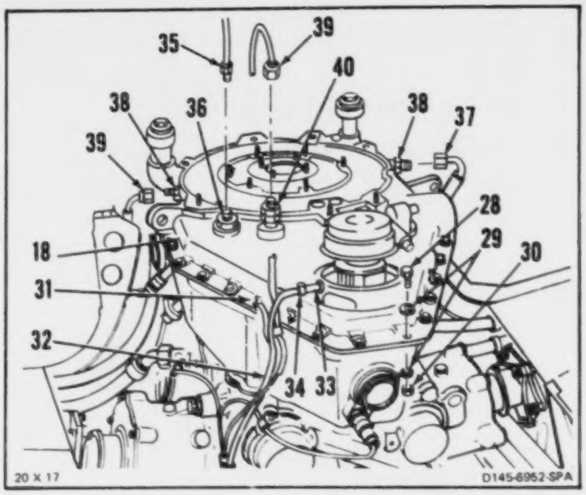
13. From inside helicopter, **install eight** washers (25) and **nuts (26)** on studs (27) at aft edge of sump cover (18). **Torque nuts to 60 inch-pounds.**


A
18
27
26
25
STA
482
FORWARD
VIEW
LOOKING
UP
VIEW A
20 x 17
D145 6951 SPA

*GO TO NEXT PAGE*

## 6-192 INSTALL COMBINING TRANSMISSION SUMP (Continued) 6-192

14. **Install 23 bolts (28), washers (29), and nuts (30)** around sump cover (18). Install clip (31) under head of bolt where shown. **Torque nuts to 60 inch-pounds.**
15. **Connect drainline (32)** to hose nipple (33). Tighten clamp (34).
16. **Connect straight end of oil hose (35)** to union (36).
17. **Connect breather hose (37)** to reducer (38) on each side of sump cover (18).
18. **Connect electrical connector (39)** to oil pressure switch (40).



*INSPECT*

FOLLOW-ON MAINTENANCE:

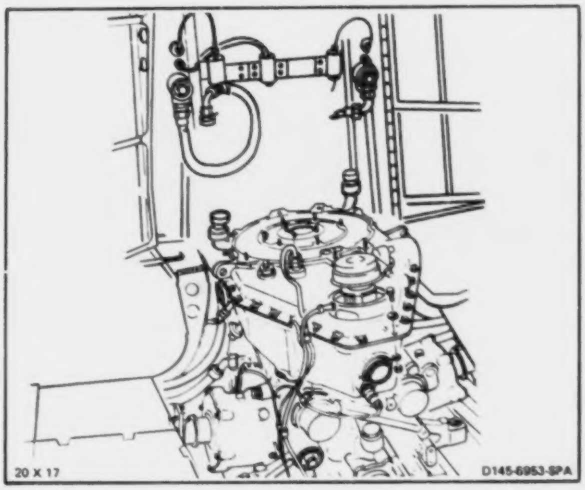
Install combining transmission oil cooler (Task 6-188).

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission sump (Task 1-54).

Close aft pylon doors (Task 2-2).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-193 REPLACE COMBINING TRANSMISSION SIGHT GAGE 6-193

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Hose, 1-Inch id, 36 Inches Long
Spanner Wrench
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

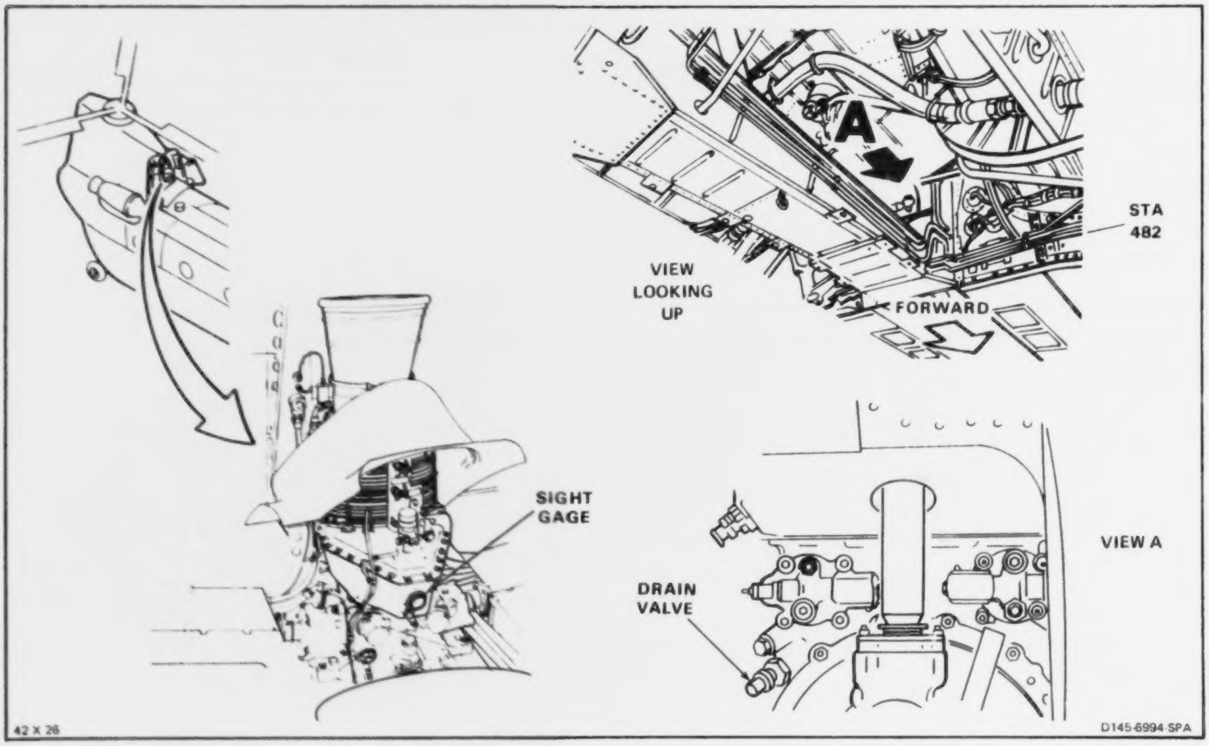
***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer (2)
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)

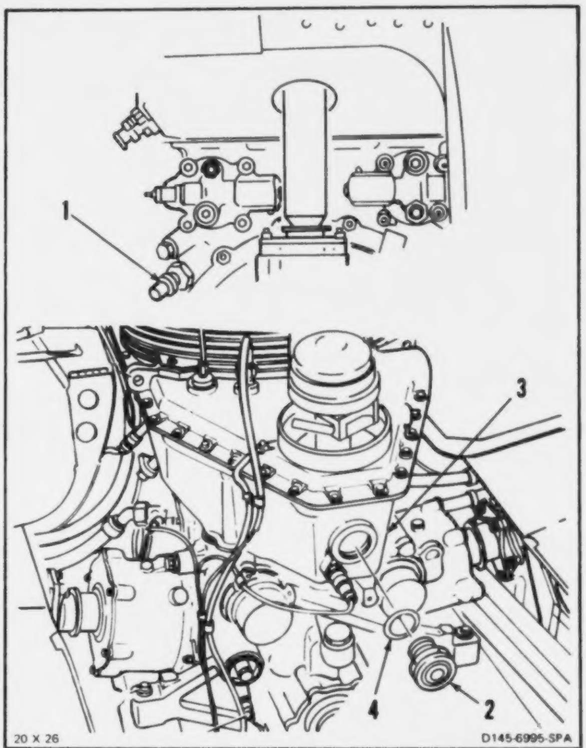

A
STA 482
VIEW LOOKING UP
FORWARD
SIGHT GAGE
VIEW A
DRAIN VALVE
42 X 26
D145-6994-SPA

***GO TO NEXT PAGE***

## 6-193 REPLACE COMBINING TRANSMISSION SIGHT GAGE (Continued) 6-193

### *REMOVE SIGHT GAGE*

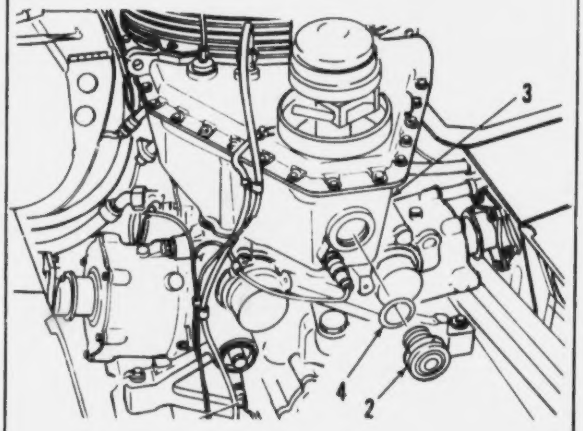
1. From inside cabin, **connect hose** to drain valve (1). Direct end of hose into container.
2. Have helper view sight gage (2) on sump (3). Push in drain valve (1), twist, and pull. **Drain oil** until level is below gage.
3. Close drain valve (1) by pushing it in and twisting it. Disconnect hose from valve.
4. Remove lockwire from sight gage (2). **Remove gage** from sump (3). Use spanner wrench.
5. Remove packing (4) from sight gage (2).



20 X 26 D145-6995-SPA

### *INSTALL SIGHT GAGE*

6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. **Install sight gage (2)** in sump (3). Use spanner wrench. **Torque gage to 80 inch-pounds.**



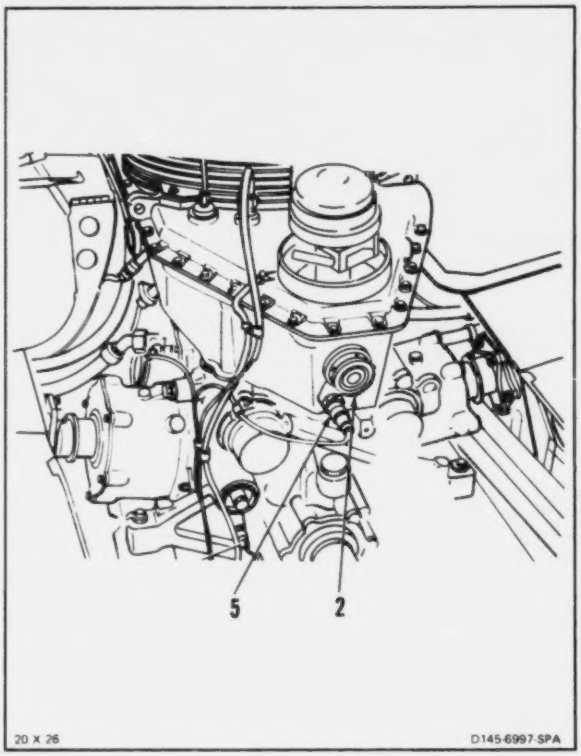
20 X 26 D145-6996-SPA

***GO TO NEXT PAGE***

## 6-193 REPLACE COMBINING TRANSMISSION SIGHT GAGE (Continued) 6-193

8. Lockwire sight gage (2) to temperature probe (5). Use lockwire (E231).

*INSPECT*



FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-194 CONTAMINATION ANALYSIS OF ENGINE TRANSMISSION OIL 6-194

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Magnet
Magnifying Glass, 12-Power

***Materials:***
None

***Personnel Required:***
67U30 Inspector

***Equipment Condition:***
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:

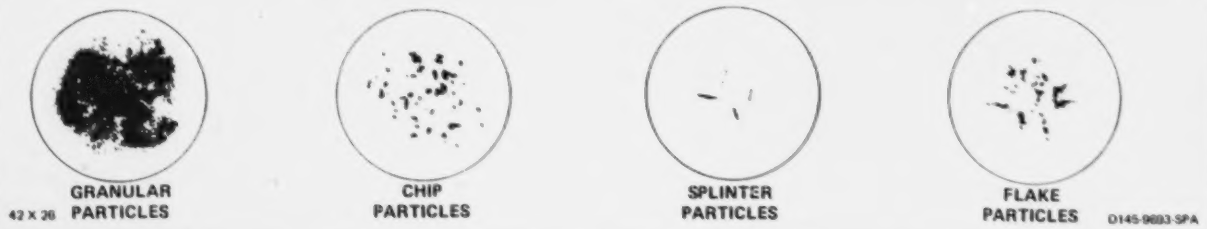
   a. Separate steel particles. Use a magnet.

   b. Identify and separate remaining particles by visual inspection.

   c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

FOLLOW-ON MAINTENANCE:
None

| MATERIAL | DESCRIPTION | ACTION REQUIRED |
|---|---|---|
| Steel | Fine, hair-like fuzz particles | Normal wear. No action required |
| | Limited amount of splinters, flakes, or granular particles | Possible failure. Perform serviceability check (Task 6-198) |
| | Thin flakes up to 1/16-inch in diameter and 1/4-inch long, maximum of 10 flakes | Perform serviceability check (Task 6-198) |
| | Massive amount of splinters, flakes, or granular particles | Failure. Replace transmission (Task 6-100 and 6-107) |
| Aluminum or magnesium | Granular particles | Perform serviceability check (Task 6-198) |
| Copper, bronze, or silver | Limited amount of granular particles | Possible indication of bearing cage wear. Perform serviceability check (6-198) |
| | Massive amount of granular particles or chip particles | Failure. Replace transmission (6-100 and 6-107) |
| Fiberglass | Granular or fibrous particles | Perform serviceability check (6-198) |



END OF TASK

## 6-195 INSPECTION—ALLOWABLE LEAKAGE OF ENGINE TRANSMISSION OIL 6-195

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Helicopter on Level Surface

---

Engine transmission oil is supplied by the combining transmission oil system. Refer to Task 6-167.

FOLLOW-ON MAINTENANCE:
None

**END OF TASK**

## 6-196 DRAIN ENGINE TRANSMISSION OIL 6-196

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Socket, 1 3/8-Inch
Torque Wrench, 30 to 150 Inch-Pounds

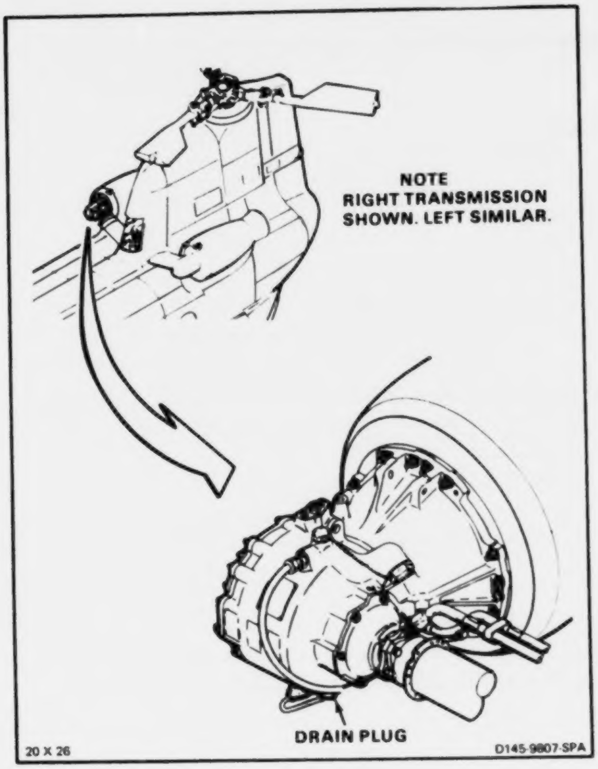
***Materials:***
Lockwire (E231)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Transmission Compartment of Combining Transmission Sump Drained (Task 6-168).
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)


NOTE
RIGHT TRANSMISSION SHOWN. LEFT SIMILAR.
DRAIN PLUG
20 X 26
D145-9807-SPA

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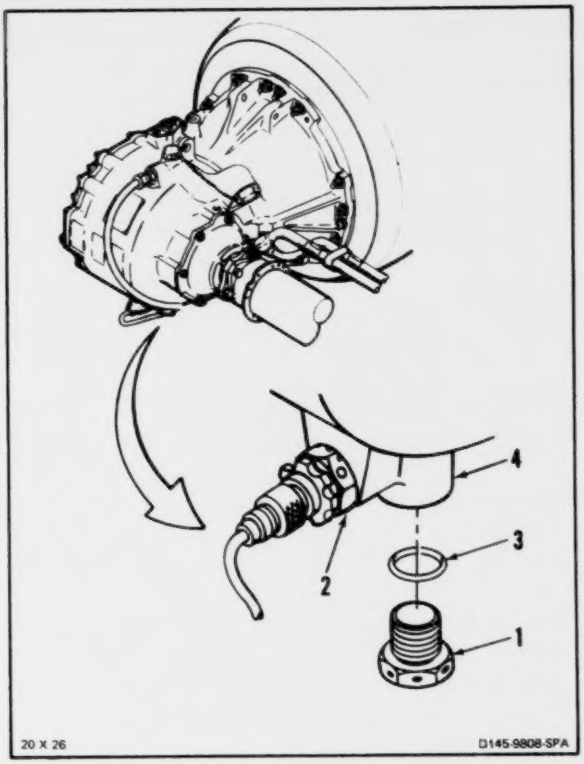
## 6-196 DRAIN ENGINE TRANSMISSION OIL (Continued) 6-196

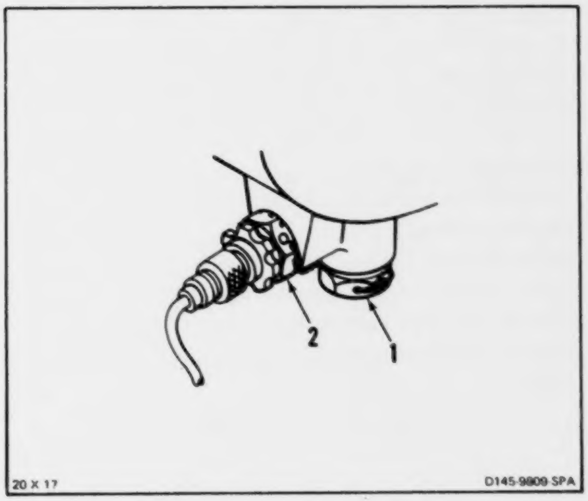
**NOTE**

Drain either engine transmission in same way. Right transmission shown.

1. Remove lockwire from drain plug (1) and chip detector.
2. **Remove drain plug (1). Let oil drain** into container.
3. Remove packing (3) from drain plug (1).
4. Install packing (3) on drain plug (1). **Install plug** in transmission (4). **Torque plug to 90 inch-pounds.**



5. Lockwire drain plug (1) to chip detector (2). Use lockwire (E231).



FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet screen (Task 4-76).

END OF TASK

## 6-197 FLUSH ENGINE TRANSMISSION OIL SYSTEM 6-197

INITIAL SETUP

***Applicable Configurations:***
All

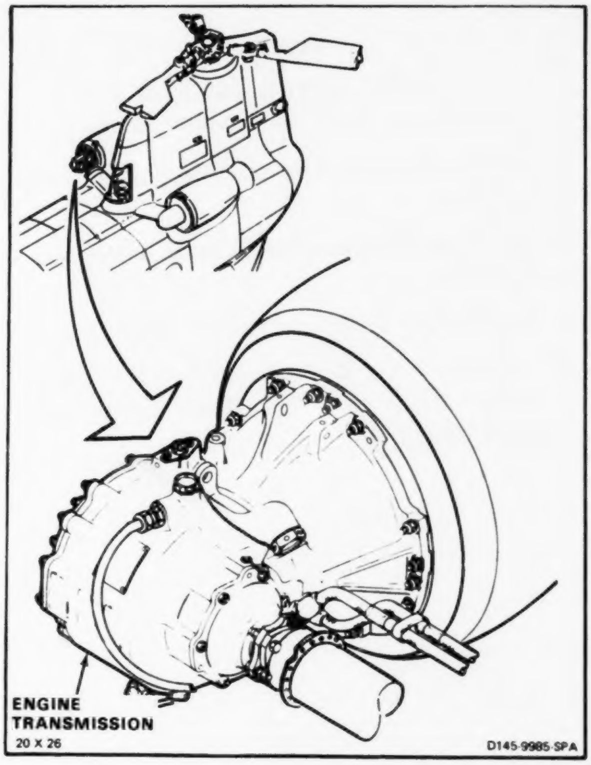
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

***References:***
Task 1-54
Task 6-196
Task 6-199
Task 6-201
Task 6-202
Task 6-203
Task 6-204
Task 6-205
Task 6-206
Task 6-207
Task 6-208
Task 6-209
Task 6-210

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



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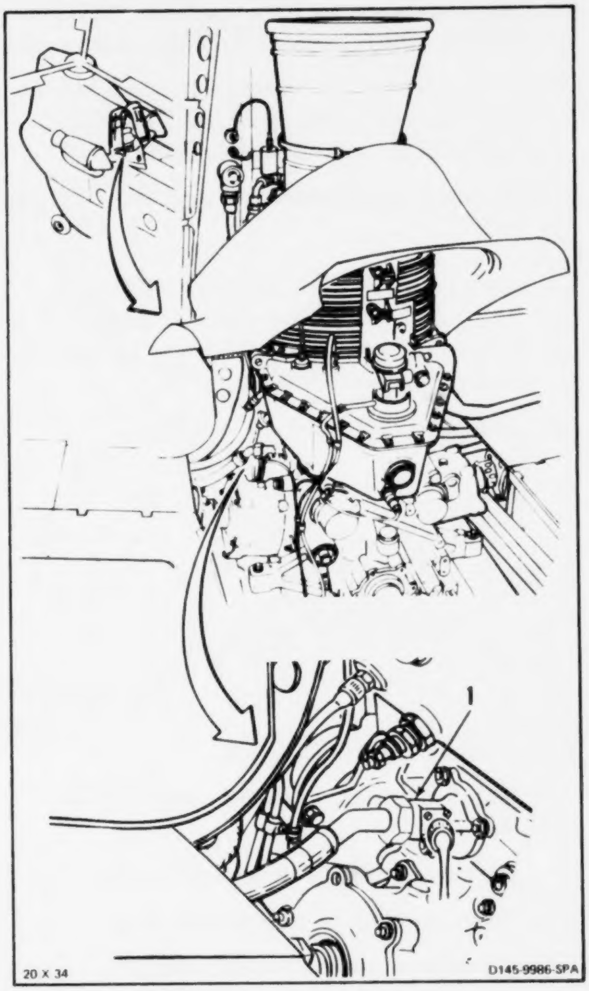
## 6-197 FLUSH ENGINE TRANSMISSION OIL SYSTEM (Continued) 6-197

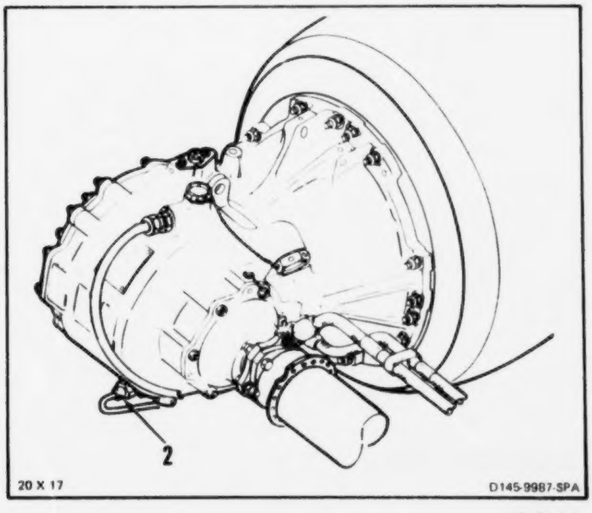
**NOTE**

Flush either engine transmission oil system in same way. Right transmission shown.

1. **Drain oil** from engine transmission (Task 6-196).
2. Remove, inspect, and **clean debris detection screen (1)** (Task 6-201 and 6-202). Install screen (Task 6-203).



3. Remove and **inspect chip detector plug (2)** (Task 6-204 and 6-205). Install plug (Task 6-206).



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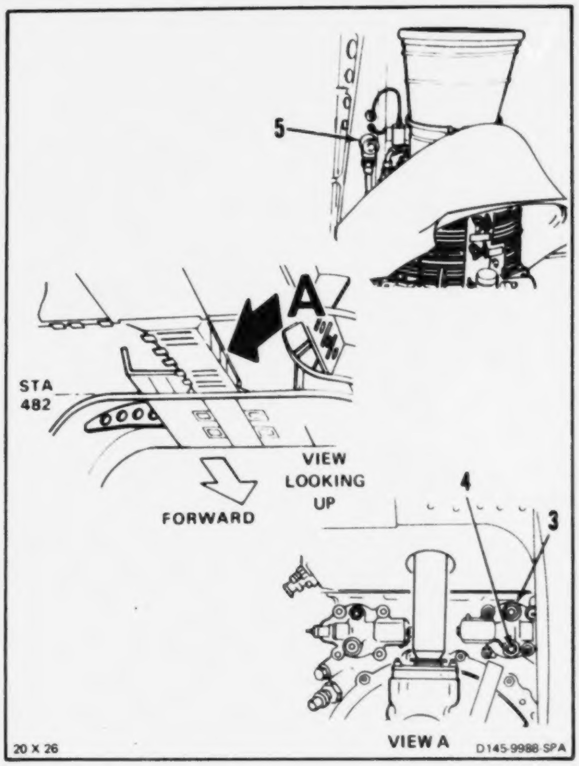
## 6-197 FLUSH ENGINE TRANSMISSION OIL SYSTEM (Continued 6-197

4. **Replace main oil filter element (3)** (Task 6-199). Note position of indicator button (4).
5. If indicator button (4) was extended, remove and **inspect inlet screen (5)** (Task 6-209 and 6-210). **Install screen** (Task 6-211).
6. **Service engine transmission** with oil (Task 1-54).
7. Have pilot **perform ground run** (TM 55-1520-240-10). When engine transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. **Repeat steps 1 thru 6.**



FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet screen (Task 4-76).

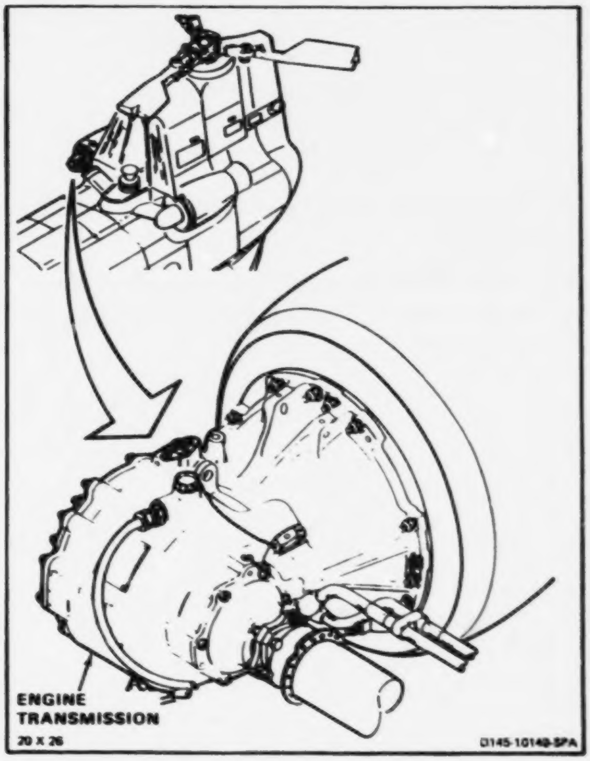
Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).

**END OF TASK**

## 6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK 6-198

INITIAL SETUP



***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Cheesecloth (E112)

***Personnel Required:***
67U20 Medium Helicopter Repairer
100C0 Rotary-Wing Aviator (2)

***References:***
Task 1-54
Task 6-100
Task 6-107
Task 6-196
Task 6-197
Task 6-199
Task 6-201
Task 6-202
Task 6-203
Task 6-204
Task 6-206
Task 6-207
6-209
6-210
6-211
TM 55-1520-240-10

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Access Doors Open (Task 2-2)
Pylon Lower Fairing Open (Task 2-2)
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)

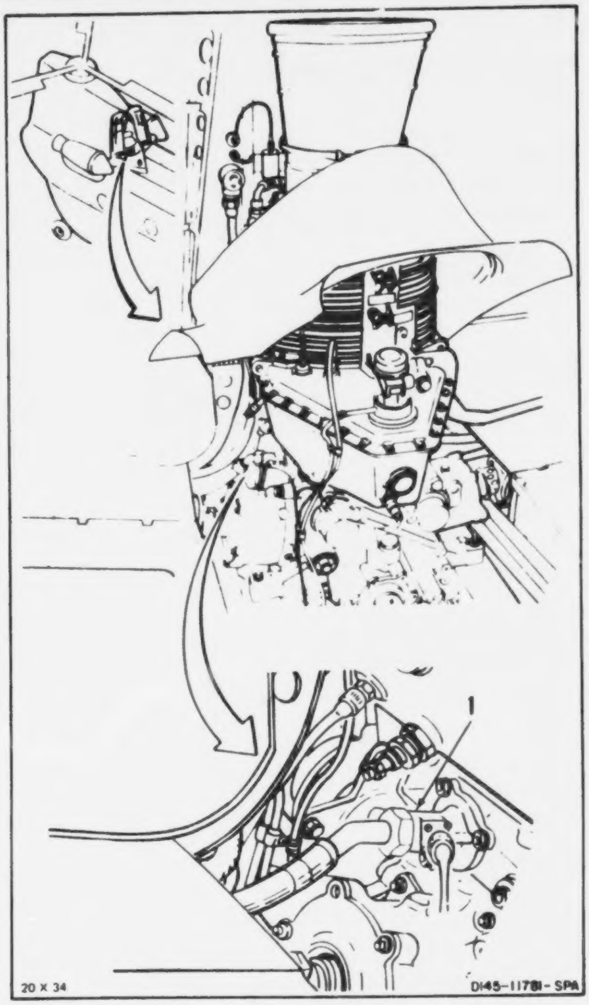
***GO TO NEXT PAGE***

## 6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued 6-198

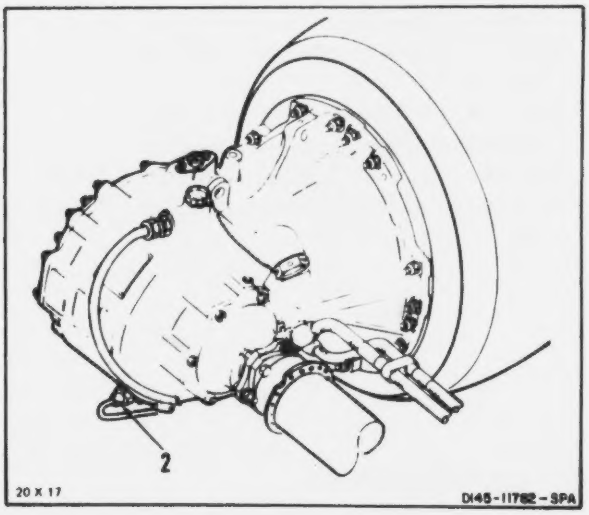
**NOTE**

Perform a serviceability check of either engine transmission in same way. Right transmission shown.

1. **Drain oil** from engine transmission (Task 6-196).
2. Remove, inspect, and **clean debris detection screen (1)** (Task 6-201 and 6-202). Install screen (Task 6-203).



3. Remove and **inspect chip detector plug (2)** (Task 6-204 and 6-205). Install plug (Task 6-206).



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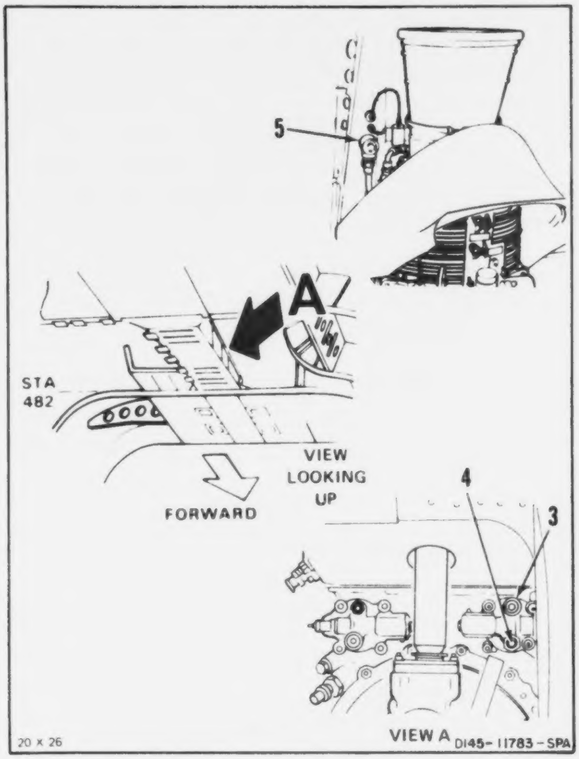
## 6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued) 6-198

4. **Replace main oil filter element (3)** (Task 6-199). Note position of indicator button (4).
5. If indicator button (4) was extended, remove and **inspect inlet screen (5)** (Task 6-209 and 6-210). **Install screen** (Task 6-211).
6. **Service transmission** (Task 1-54).


5
A
STA 482
VIEW LOOKING UP
FORWARD
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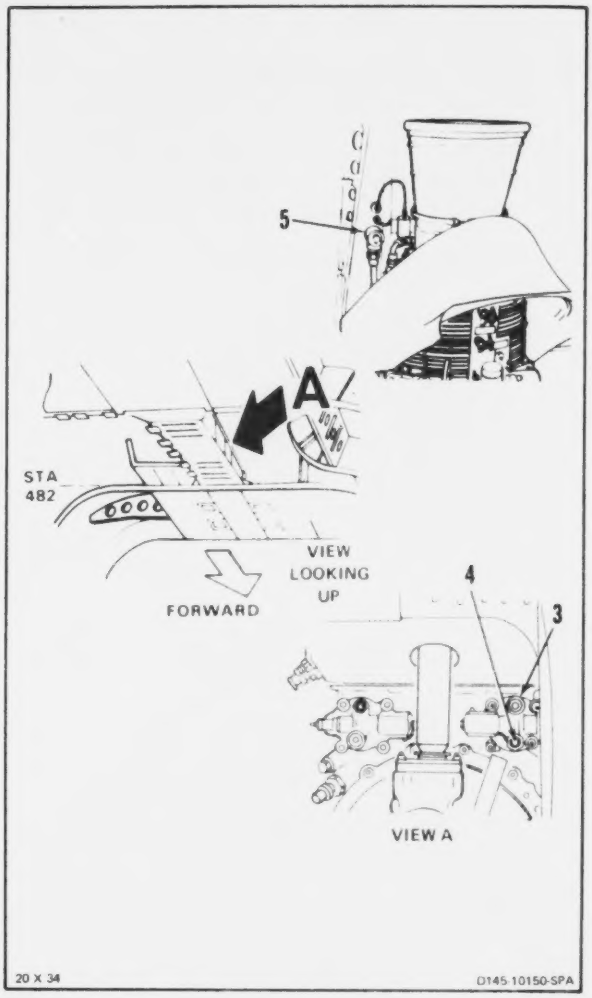
3
20 x 26
VIEW A
D145-11783-SPA

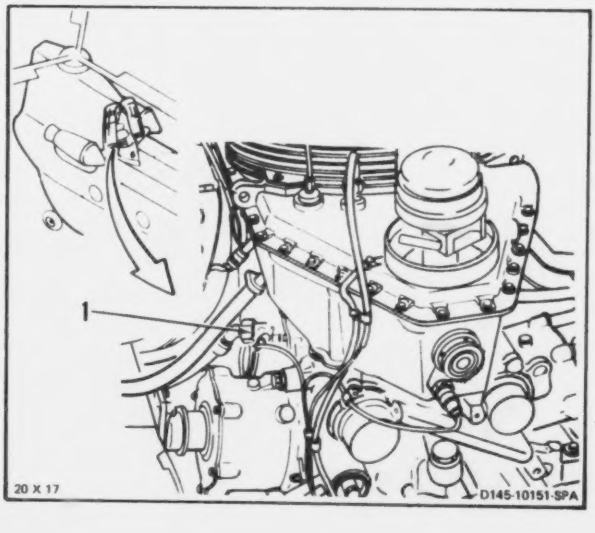
GO TO NEXT PAGE

## 6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued) 6-198

7. Have pilot **perform ground run** for 1 hour at normal rotor rpm (TM 55-1520-240-10). If engine transmission oil temperature or pressure changes abnormally, or if debris screen or chip detector light comes on during operation, have pilot shut down helicopter. Check for cause.
8. **Drain oil** through cheesecloth (E112) or similar filter material (Task 6-196). Check for contamination.
9. **Remove element in oil filter (3). If** element contains **debris or** indicator **button (4)** was **extended, replace** with new **element** (Task 6-148).
10. **If** element in filter (3) contains **debris and** indicator **button (4)** was **also extended, remove, inspect,** and install **inlet screen (5)** (Task 6-209, 6-210, and 6-211).



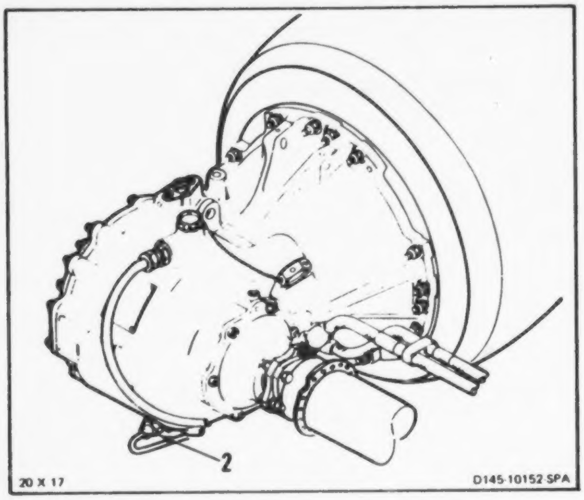
11. Remove, inspect, and **clean debris detection screen (1)** (Task 6-201 and 6-202). Install screen (Task 6-203).



*GO TO NEXT PAGE*

## 6-198 ENGINE TRANSMISSION SERVICEABILITY CHECK (Continued) 6-198

12. Remove and **inspect chip detector plug (2)** (Task 6-204 and 6-205). Install plug (Task 6-206).



13. **If** quantity and size of **particles** obtained from filter (3), screen (1), and chip detector (2) **have not decreased by at least 30 percent** from original amount, **replace engine transmission** (Task 6-100 and 6-107).

14. **If** quantity and size of **particles** obtained from filter (3), screen (1) and chip detector (2) **have decreased by 30 percent or more, repeat steps 1 thru 12.** If any more debris is obtained, replace engine transmission (Task 6-100 and 6-107).

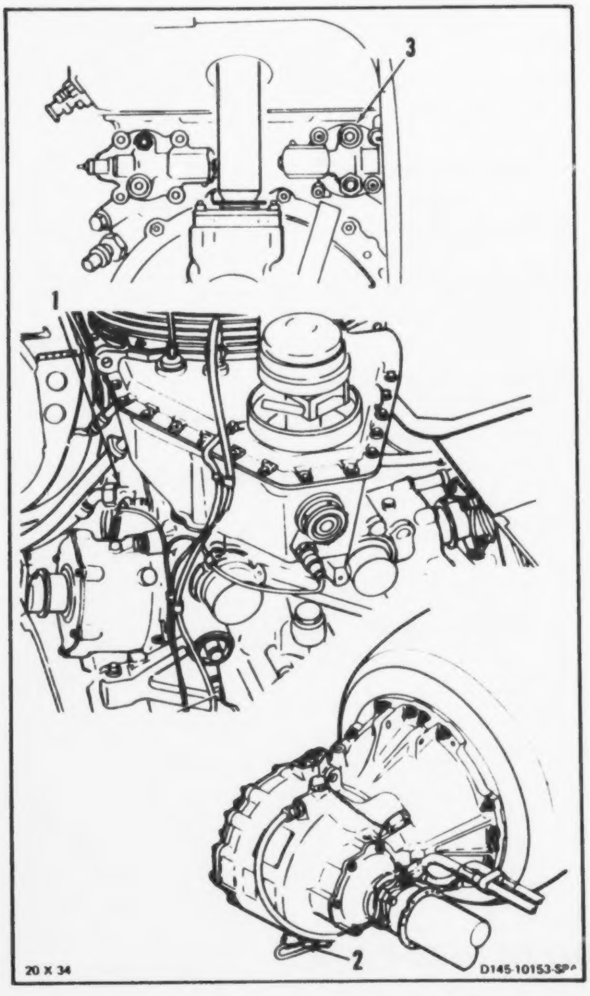
FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet screen (Task 4-76).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).



**END OF TASK**

## 6-199 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER ELEMENT 6-199

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

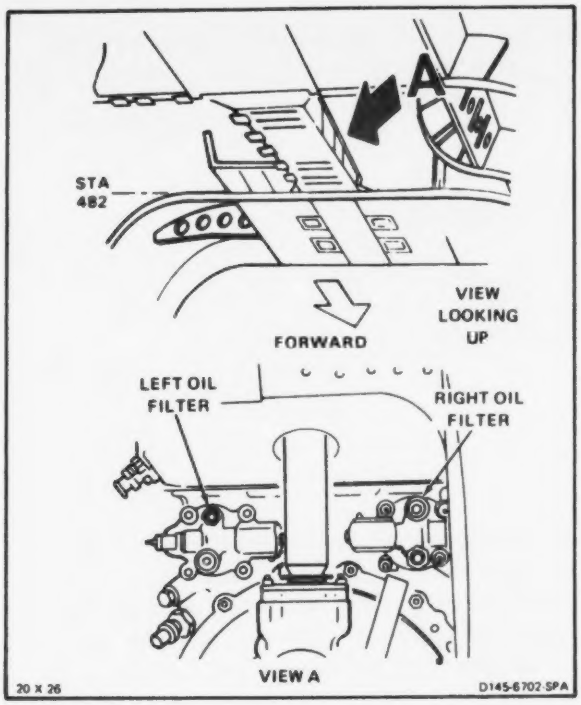
***Materials:***
Dry Cleaning Solvent (E162)
Cloths (E120)
Oil (E254)
Gloves (E186)
Lockwire (E231)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)

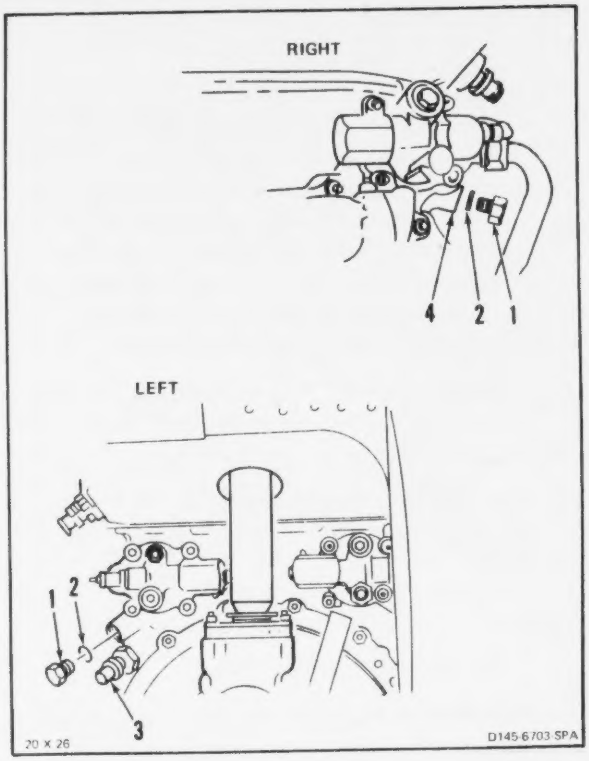

A
STA 482
FORWARD
VIEW LOOKING UP
LEFT OIL FILTER
RIGHT OIL FILTER
VIEW A
20 X 26
D145-6702-SPA

**GO TO NEXT PAGE**

## 6-199 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER ELEMENT (Continued) 6-199

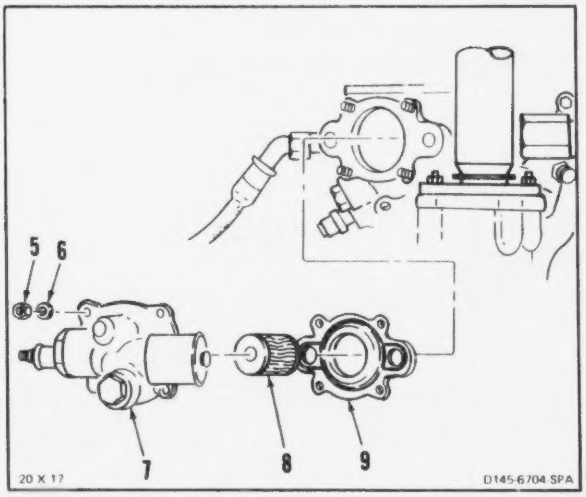
### NOTE

Procedure is same to remove left or right engine transmission main oil filter. Removal of left filter is shown here.



### *DRAIN OIL*

1. Remove lockwire from drain plug (1). **Remove plug** and packing (2). **Drain oil** into container.
2. Coat plug (1) and packing (2) with oil (E254). **Install plug** and packing. **Torque plug to 45 inch-pounds.** Lockwire plug to sump drain (3) (left filter) or transmission (4) (right filter). Use lockwire (E231).



### *REMOVE FILTER ELEMENT*

3. Remove four nuts (5) and washers (6) from filter housing (7). **Remove housing element (8), and gasket seal (9)** from transmission (4).
4. Remove element (8) from housing (7). Inspect element for debris. If debris is found, perform a contamination analysis (Task 6-108).

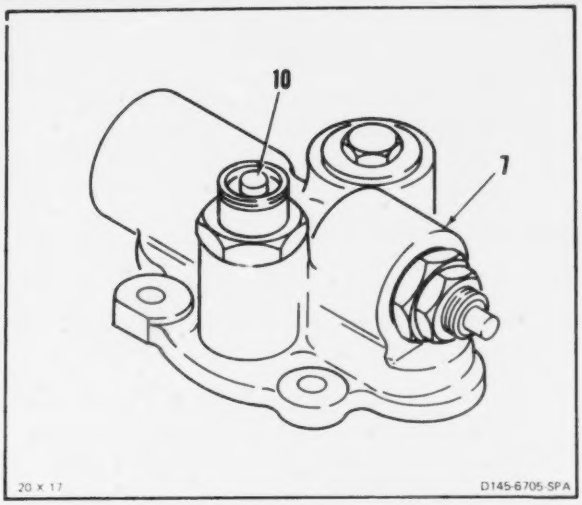
*GO TO NEXT PAGE*

## 6-199 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER ELEMENT (Continued) 6-199

### *INSTALL FILTER ELEMENT*

**WARNING**

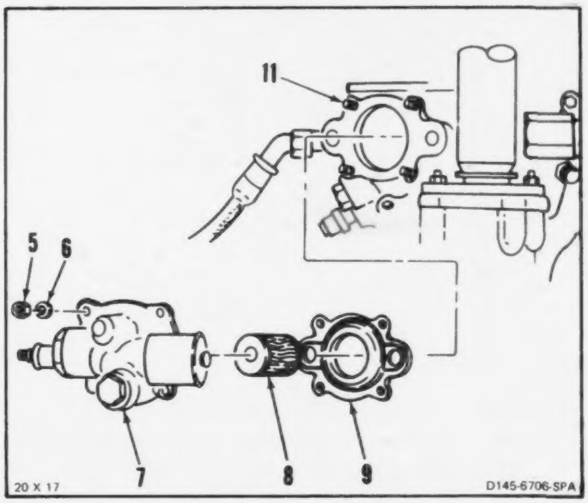
**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention.**



5. Clean inside of housing (7) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
6. Hold housing (7) with indicating button (10) up. **Push in button** to lock it down.

**NOTE**

Do not install a used filter.



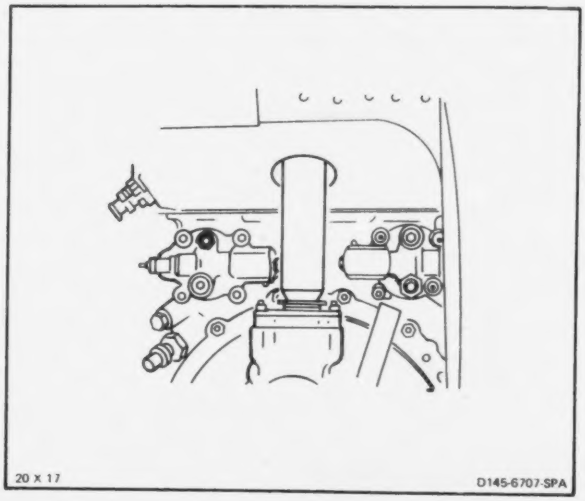
7. **Install new element (8)** in housing (7). **Install gasket seal (9) and housing** on four studs (11).
8. **Install four** washers (6) and **nuts (5). Torque nuts to 60 inch-pounds.**

### *INSPECT*

FOLLOW-ON MAINTENANCE:

Service engine transmission (Task 1-54).

Close cargo ramp (TM 55-1520-240-T).



**END OF TASK**

## 6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR 6-199.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Container, Two-Quart

Torque Wrench, 30 to 150 Inch-Pounds

Workstand

***Materials:***

Oil (E254)

Lockwire (E231)

***Parts:***

Packing

***Personnel Required:***

Medium Helicopter Repairer

Inspector

***References:***

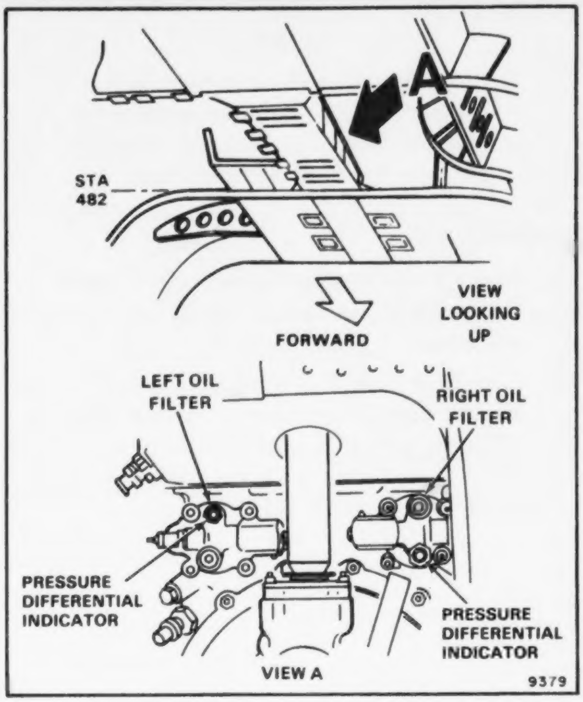
TM 55-1520-240-23P

***Equipment Condition:***

Battery Disconnected (Task 1-39)

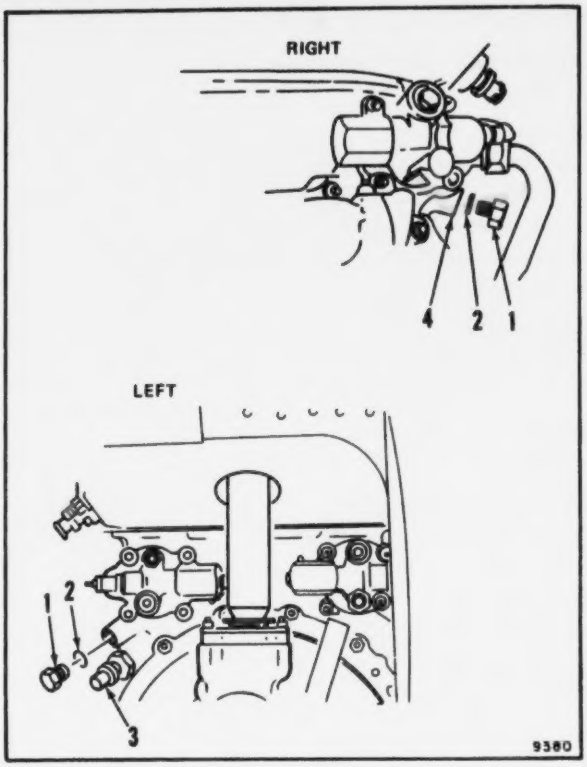
Electrical Power Off

Cargo Ramp Open and Level (TM 55-1520-240-T)


A
STA 482
FORWARD
VIEW LOOKING UP
LEFT OIL FILTER
RIGHT OIL FILTER
PRESSURE DIFFERENTIAL INDICATOR
PRESSURE DIFFERENTIAL INDICATOR
VIEW A
9379

GO TO NEXT PAGE

## 6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued) 6-199.1

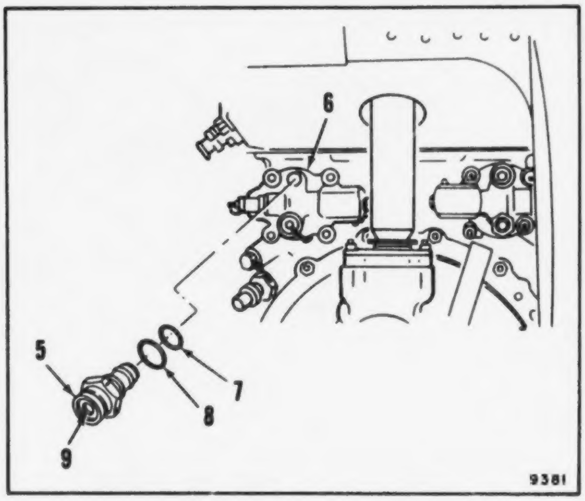


**NOTE**

Procedure is same to remove indicator from left or right engine transmission main oil filter. Removal of indicator from left filter is shown here.

***DRAIN OIL***

1. Remove lockwire from drain plug (1). **Remove plug** and packing (2). **Drain oil** into container.
2. Coat plug (1) and packing (2) with oil (E254). **Install plug** and packing. **Torque plug to 45 inch-pounds.** Lockwire plug to sump drain (3) (left filter) or transmission (4) (right filter). Use lockwire (E231).



***REMOVE INDICATOR***

3. Remove lockwire from pressure differential indicator (5). **Remove indicator** from housing (6).
4. Remove two packings (7 and 8) from indicator (5).

***INSTALL INDICATOR***

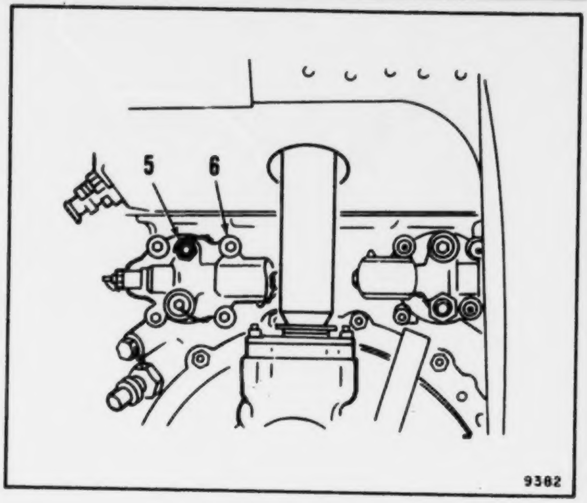
5. **Install two packings (7 and 8)** on indicator (5).
6. Hold indicator (5) so that button (9) points up. **Check that button is pushed in and locked.**
7. **Install indicator (5)** in housing (6).

***GO TO NEXT PAGE***

## 6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued) 6-199.1

8. Lockwire indicator (5) to housing (6). Use lockwire (E231).

***INSPECT***



FOLLOW-ON MAINTENANCE:

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-200 ADJUST ENGINE TRANSMISSION MAIN OIL PUMP 6-200

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Workstand

***Materials:***

Lockwire (E230)

***Personnel Required:***

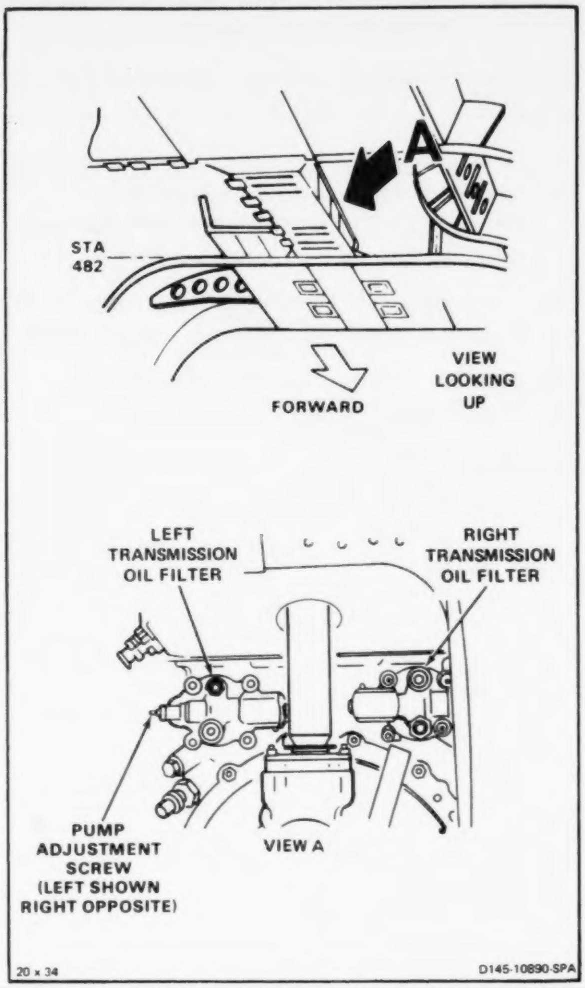
Medium Helicopter Repairer
Inspector
Army Rotary-Wing Aviator (2)

***References:***

TM 55-1520-240-10

***Equipment Condition:***

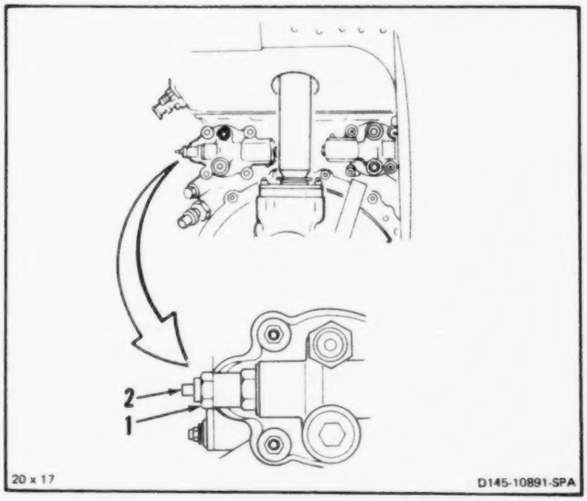
Battery Disconnected (Task 1-39)
Electrical Power Off
Cargo Ramp Open and Level (TM 55-1520-240-T)


A
STA 482
FORWARD
VIEW LOOKING UP
LEFT TRANSMISSION OIL FILTER
RIGHT TRANSMISSION OIL FILTER
PUMP ADJUSTMENT SCREW (LEFT SHOWN RIGHT OPPOSITE)
VIEW A
20 x 34
D145-10890-SPA

### NOTE

Procedure is same to adjust left or right engine transmission pump. Adjustment of pump shown here.

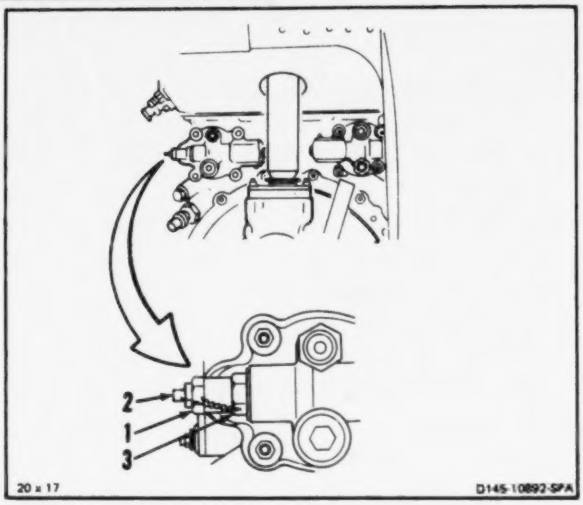
1. Remove lockwire from locknut (1) and setscrew (2). Hold setscrew and **loosen locknut.**
2. **Turn setscrew no more than 1/4 turn to adjust** transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is 40 to 70 psi.
3. Hold setscrew (2). **Torque locknut (1) to 60 inch-pounds.**


2
1
20 x 17
D145-10891-SPA

*GO TO NEXT PAGE*

## 6-200 ADJUST ENGINE TRANSMISSION MAIN OIL PUMP (Continued) 6-200

4. Have pilot perform ground run at 100 percent rotor rpm until engine transmission oil temperature and pressure stabilize. **Record oil pressure.**
5. If oil pressure is 40 to 70 psi, go to step 6. **If pressure is not 40 to 70 psi, repeat task.**
6. Lockwire locknut (1) and setscrew (2) to retaining nut (3). Use lockwire (E230).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Close cargo ramp (TM 55-1520-240-T).

**END OF TASK**

## 6-201 REMOVE ENGINE TRANSMISSION DEBRIS DETECTION SCREEN 6-201

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1 1/2-Inch
Container, Two Quart

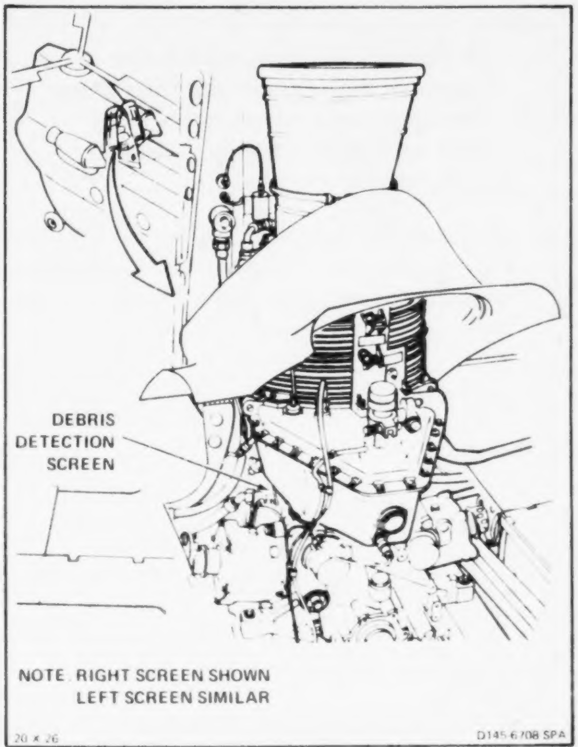
***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Open (Task 2-2)

**NOTE**

Procedure is same to remove left or right transmission debris detection screen. Removal of right screen is shown here.



NOTE. RIGHT SCREEN SHOWN
LEFT SCREEN SIMILAR

**GO TO NEXT PAGE**

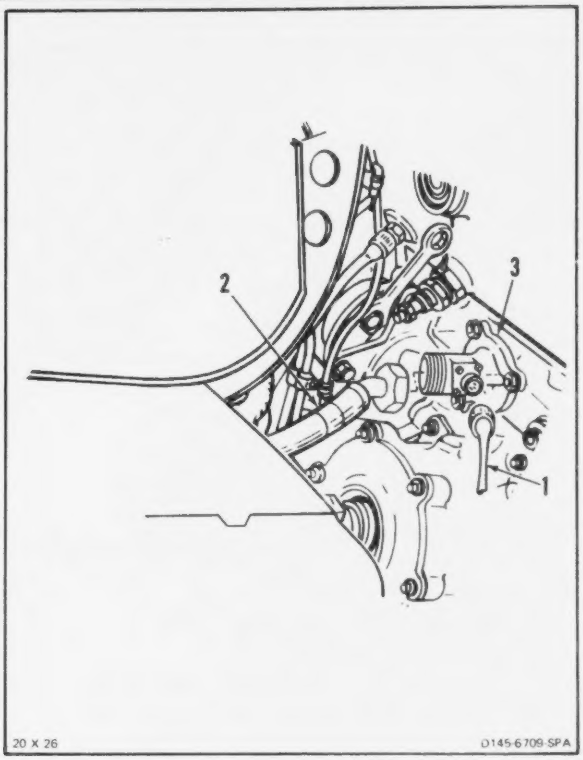
## 6-201 REMOVE ENGINE TRANSMISSION DEBRIS DETECTION SCREEN (Continued) 6-201

1. **Disconnect electrical connector (1).**

**CAUTION**

**If hose is not removed from screen, debris may fall into hose when screen is removed from transmission. Continued contamination may result.**

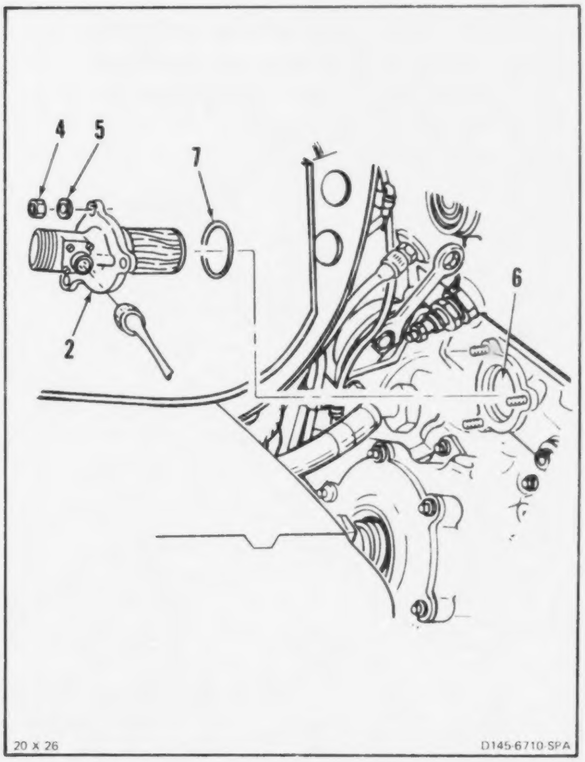
2. **Disconnect hose (2)** from screen (3). Cap hose quickly to prevent oil loss. Catch spilled oil in container. Retain spilled oil for contamination analysis (Task 6-108).



3. Remove three washers (4) and nuts (5). **Remove screen (2)** from transmission cavity (6). Catch spilled oil in container.
4. Remove packing (7) from screen (2).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

## 6-202 INSPECT ENGINE TRANSMISSION DEBRIS DETECTION SCREEN 6-202

INITIAL SETUP

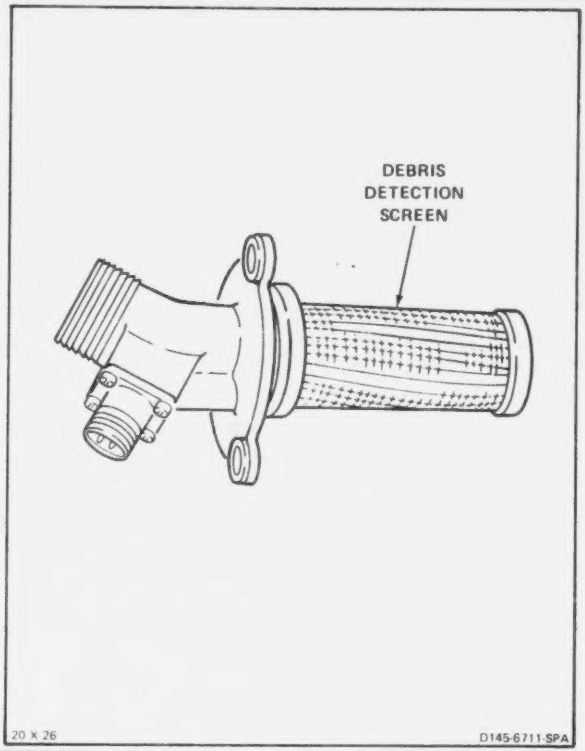
***Applicable Configurations:***
All

***Tools:***
Goggles

***Materials:***
Dry Cleaning Solvent (E162)
Cloth (E120)
Brush (E86)
Gloves (E186)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Off Helicopter Task



1. **Check screen (1)** for bits of metal and other debris. Retain all debris for contamination analysis (Task 6-108).

**WARNING**

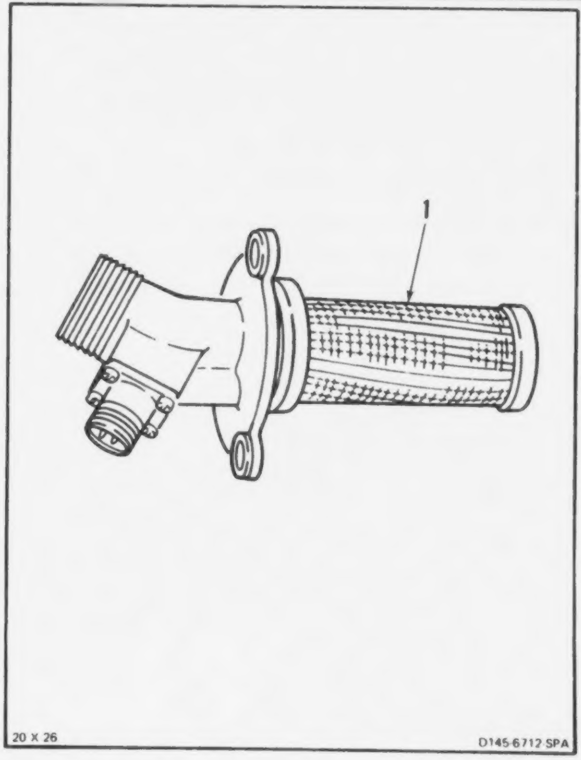
**Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

2. **Clean screen (1)** with dry cleaning solvent (E162) and brush (E86). Wear gloves (E186) and goggles.
3. **Inspect screen (1)** for tears. There shall be no tears.

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**



## 6-203 INSTALL ENGINE TRANSMISSION DEBRIS DETECTION SCREEN

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, Two Quart
Open End Wrench, 1 1/2-Inch
Crows Foot, 1 1/2-Inch
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
None

***Parts:***
Packing

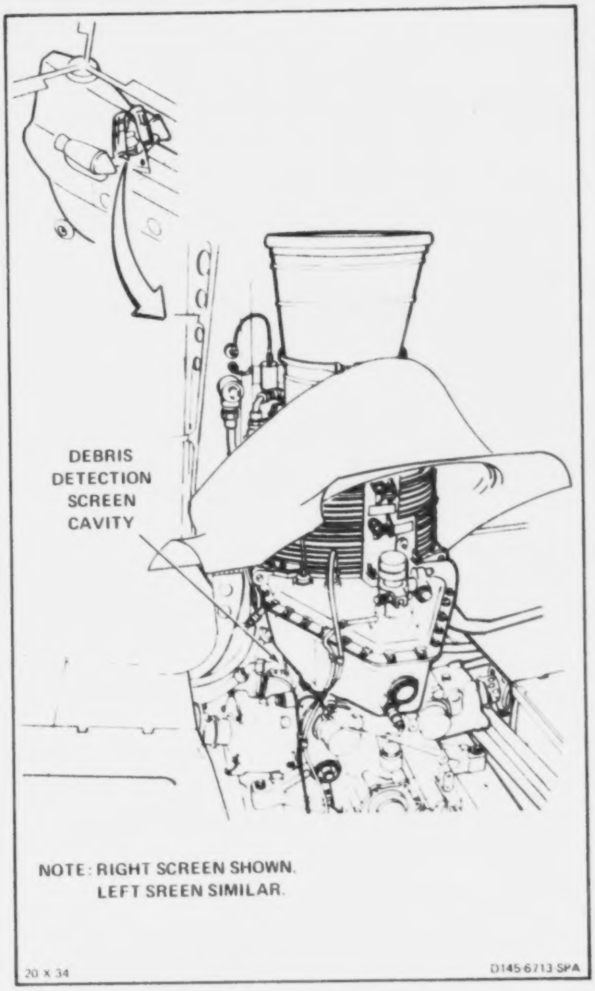
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P
TM 55-1520-240-T

***Equipment Condition:***
Engine Transmission Debris Detection Screen Inspected (Task 6-202)

**NOTE**

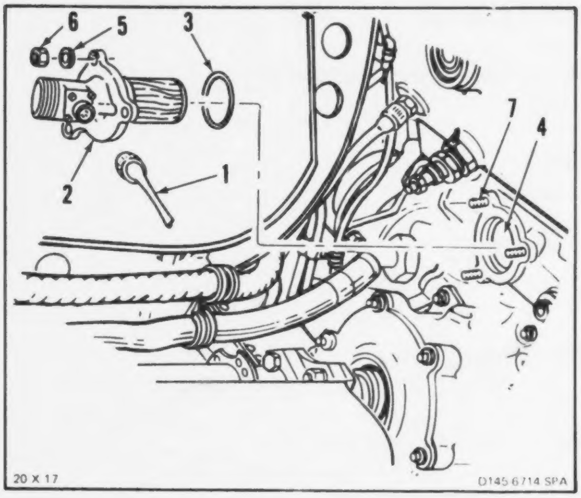
Procedure is same to install left or right transmission debris detector screen. Installation of right screen is shown here.


DEBRIS
DETECTION
SCREEN
CAVITY
NOTE: RIGHT SCREEN SHOWN.
LEFT SREEN SIMILAR.
20 X 34
D145-6713 SPA

***GO TO NEXT PAGE***

## 6-203 INSTALL ENGINE TRANSMISSION DEBRIS DETECTION SCREEN (Continued)

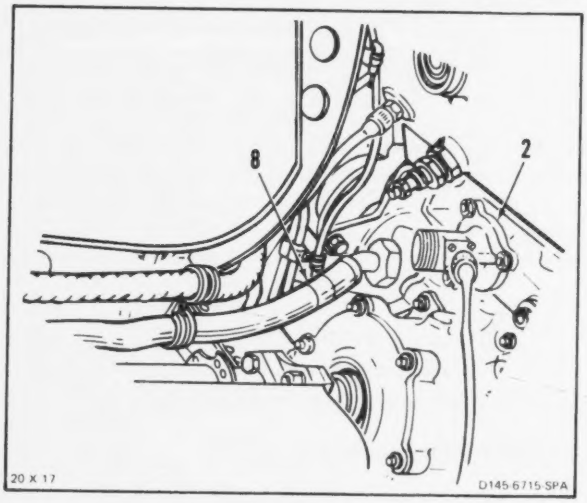
1. **Connect electrical connector (1)** to screen (2).
2. **Perform operational check** of engine transmission debris detection system (TM 55-1520-240-T).
3. Install packing (3) on screen (2). **Install screen** in transmission cavity (4).
4. **Install** washers (5) and **nuts (6)** on three studs (7). **Torque nuts to 60 inch-pounds.**



**NOTE**

Connect hose quickly to prevent oil loss.

5. Remove cap and **connect oil hose (8)** to screen (2). Use container to catch spilled oil. **Torque hose to 80 inch-pounds.**



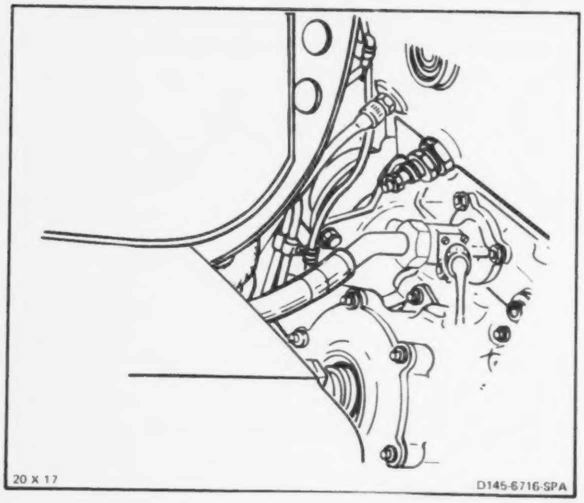
***INSPECT***

FOLLOW-ON MAINTENANCE:

Service engine transmission (Task 1-54).

Close aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).



**END OF TASK**

## 6-204 REMOVE ENGINE TRANSMISSION CHIP DETECTOR PLUG 6-204

INITIAL SETUP

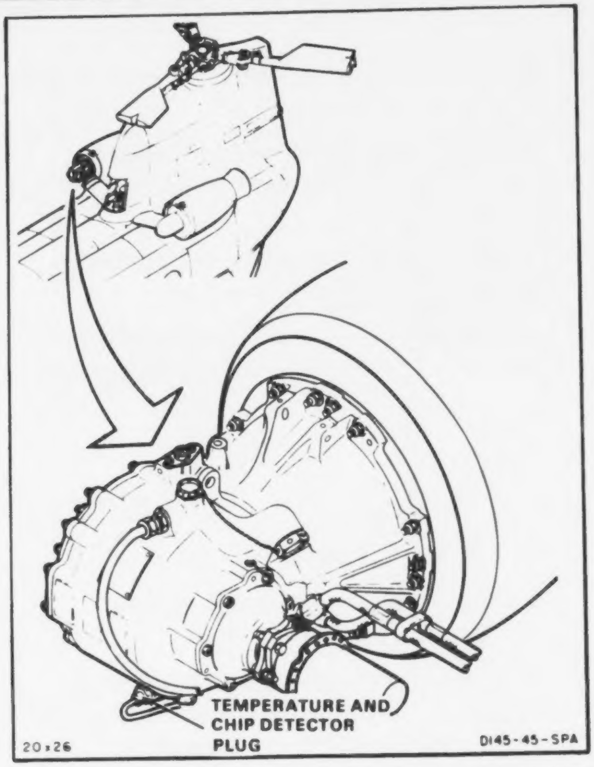
***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

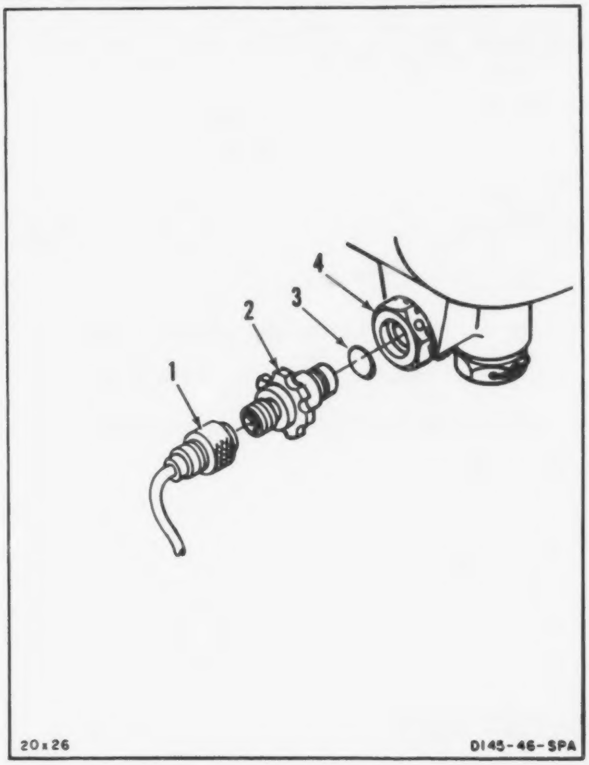
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)


TEMPERATURE AND
CHIP DETECTOR
PLUG
20x26
D145-45-SPA

**NOTE**

Procedure is same to remove plug from right or left engine transmission. Right transmission is shown here.

1. **Disconnect cable plug (1).**
2. Push in chip detector plug (2) and turn counterclockwise. **Remove chip detector plug** and packing (3) from body (4).


1
2
3
4
20x26
D145-46-SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-205 INSPECT ENGINE TRANSMISSION CHIP DETECTOR PLUG 6-205

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

None

***Materials:***

Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)
Steel Nut, 1/4-28

***Personnel Required:***

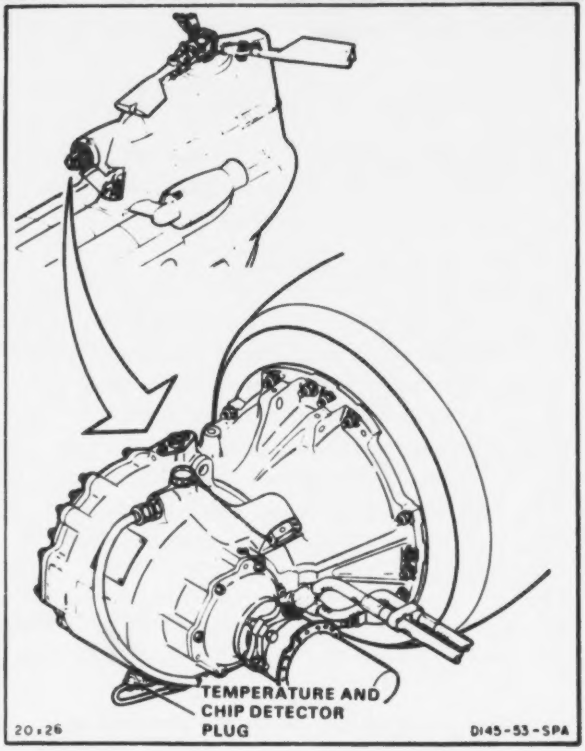
Medium Helicopter Repairer
Inspector

***References:***

TM 55-1520-240-23P
TM 55-1520-240-T

***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Engine Air Inlet Screen Removed (Task 4-65)
Engine Transmission Fairing Removed (Task 4-70)



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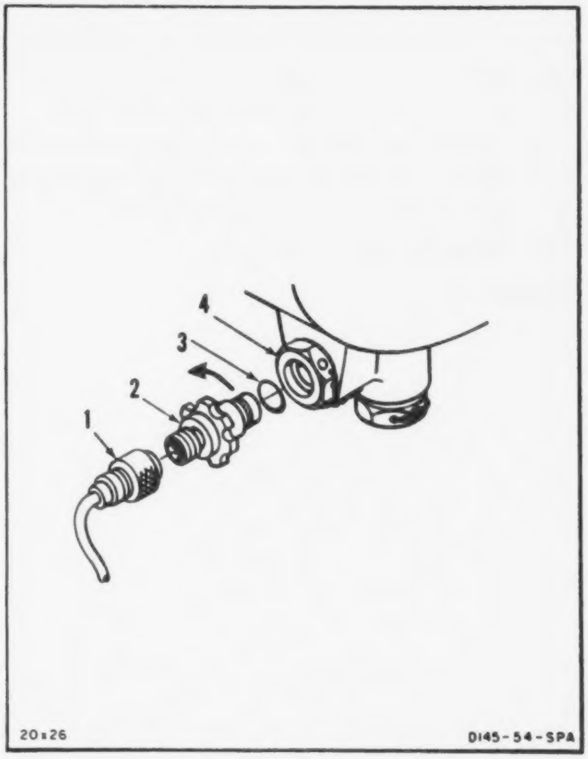
### NOTE

Procedure is same to inspect plug on left or right engine transmission. Right transmission is shown here.

1. **Disconnect cable plug (1).**
2. Push in chip detector plug (2) and turn counterclockwise. **Remove chip detector plug** and packing (3) from body (4).



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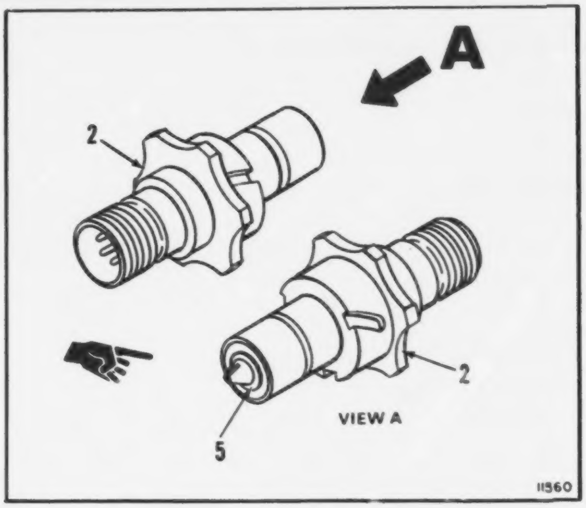
## 6-205 INSPECT ENGINE TRANSMISSION CHIP DETECTOR PLUG (Continued) 6-205



**NOTE**

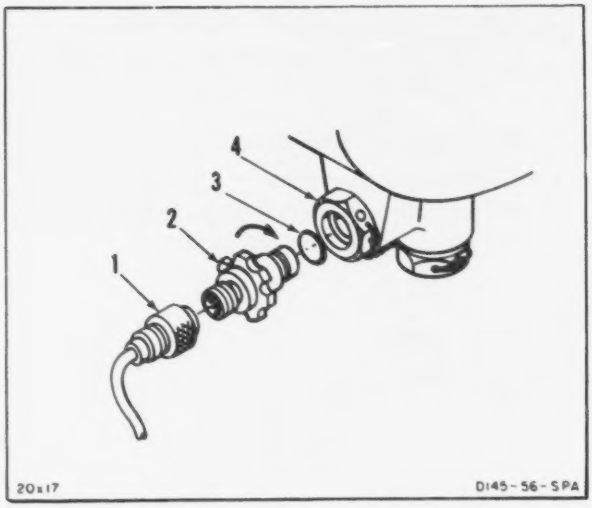
Some fuzz on tip of plug is normal.

3. **Check tip (5) of plug (2) for chips.** Remove any chips and save them for contamination analysis (Task 6-194).

**WARNING**

**Dry cleaning solvent (E162) is flammable and toxic. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

4. Clean tip (5) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry tip.
5. Check magnetism of tip (5). Tip shall lift a 1/4-28 steel nut.



6. Perform operational check of chip detector plug (2) (TM 55-1520-240-T).
7. **Install chip detector plug (2)** and packing (3) in body (4). Push in and turn chip detector plug clockwise to lock in place.
8. **Connect cable plug (1).**

***INSPECT***

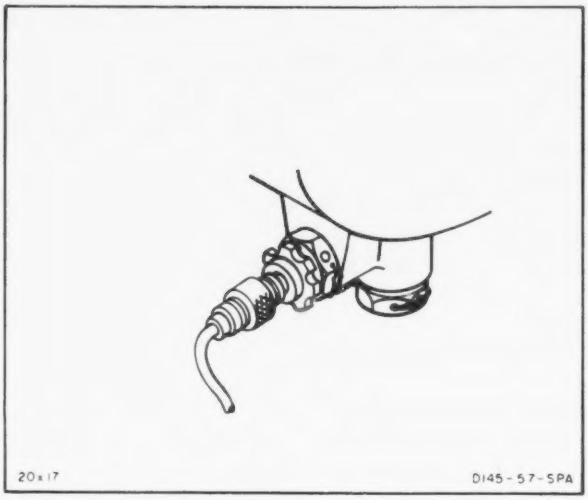
*GO TO NEXT PAGE*

## 6-205 INSPECT ENGINE TRANSMISSION CHIP DETECTOR PLUG (Continued) 6-205

FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

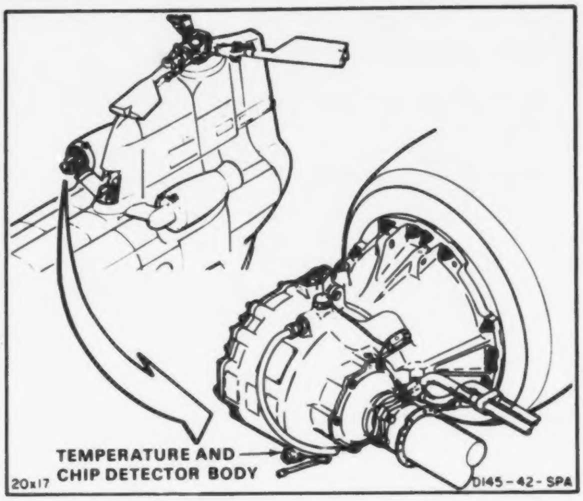
Install engine air inlet fairing (Task 4-75).



**END OF TASK**

## 6-206 INSTALL ENGINE TRANSMISSION CHIP DETECTOR PLUG 6-206

INITIAL SETUP


TEMPERATURE AND CHIP DETECTOR BODY
20x17
DI45-42-SPA

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
None

***Parts:***
Preformed Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Operational Check of Temperature and Chip Detector Plug Performed (TM 55-1520-240-T)

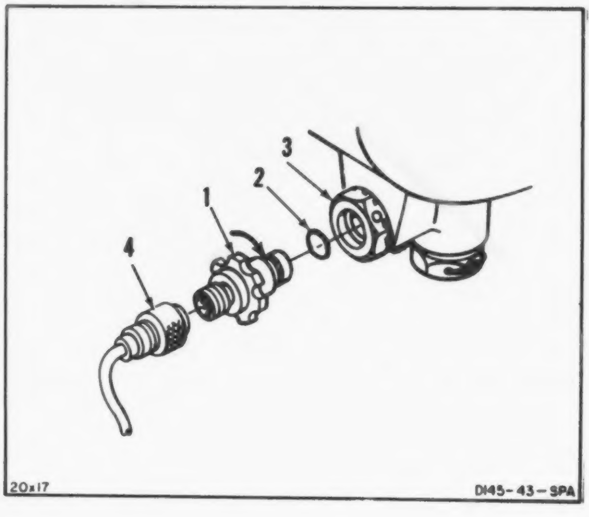
---

**NOTE**

Procedure is same to install plug on left or right engine transmission. Right transmission is shown here.

1. **Install chip detector plug (1)** and packing (2) in body (3). Push in and turn chip detector plug clockwise to lock in place.

2. **Connect cable plug (4).**


3
2
1
4
20x17
DI45-43-SPA

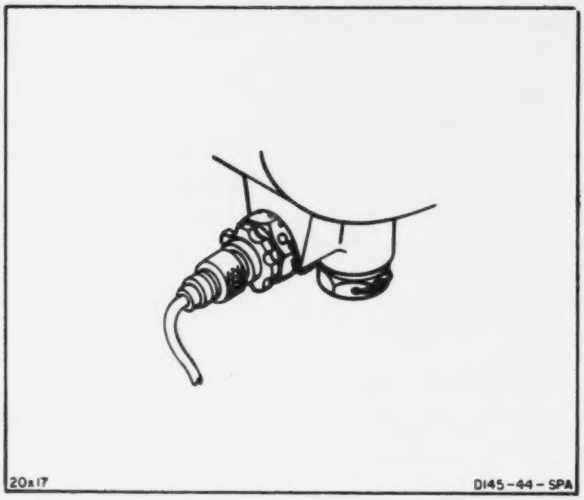
**GO TO NEXT PAGE**

## 6-206 INSTALL ENGINE TRANSMISSION CHIP DETECTOR PLUG (Continued) 6-206

FOLLOW-ON MAINTENANCE:

Install engine transmission fairing (Task 4-73).

Install engine air inlet fairing (Task 4-75).



**END OF TASK**

## 6-207 REMOVE ENGINE TRANSMISSION TEMPERATURE AND CHIP DETECTOR 6-207

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Torque Wrench, 0 to 150 Inch-Pounds
- Container, 1-Gallon
- Modified Socket (E54)

***Materials:***

Cloths (E120)

***Parts:***

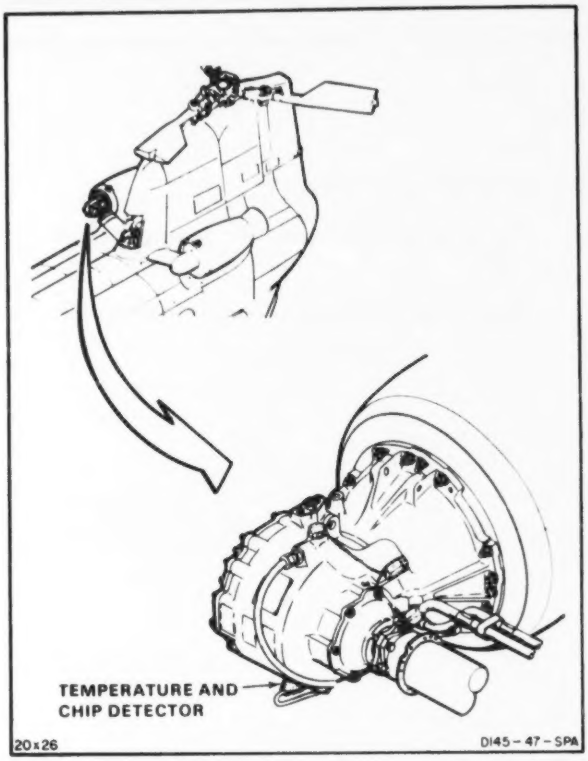
Preformed Packing

***Personnel Required:***

Medium Helicopter Repairer

***Equipment Condition:***

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Engine Air Inlet Screen Removed (Task 4-65)
- Engine Transmission Fairing Removed (Task 4-70)



---

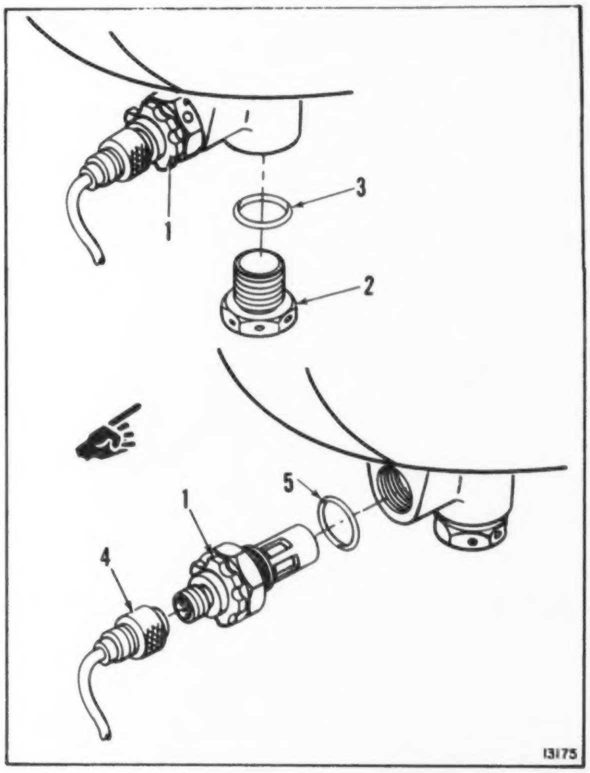
**NOTE**

Procedure is same to remove temperature and chip detector from left or right engine transmission. Right transmission is shown here.

1. Remove lockwire from detector (1) and drain plug (2).
2. Remove plug (2) and packing (3). **Drain oil.** Use container for oil.
3. Install plug (2) and packing (3). **Torque plug to 90 inch-pounds.**
4. Wipe up any spilled oil with cloths (E120).
5. **Disconnect cable plug (4).**
6. **Remove detector (1)** and packing (5). Use modified socket (E54).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-207.1 FUNCTIONAL TEST OF ENGINE TRANSMISSION CHIP DETECTOR AND TEMPERATURE TRANSMITTER 6-207.1

INITIAL SETUP

***Applicable Configurations:***
All

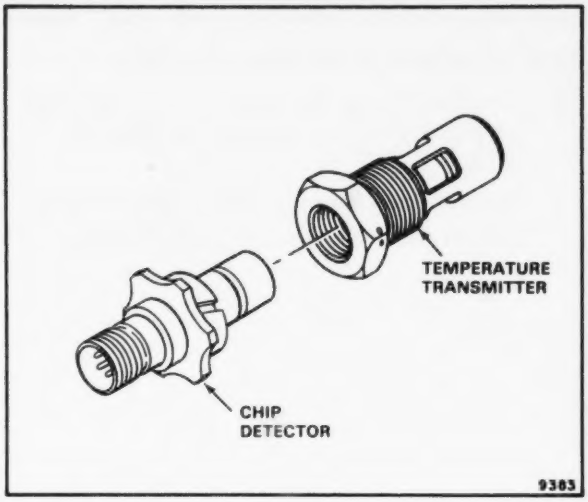
***Tools:***
Electrical Repairer's Tool Kit,
NSN 5180-00-323-4915
Torque Wrench, 30 to 150 Inch-Pounds
Multimeter

***Materials:***
Steel Hex Nut, 1/4-20 or 28
Oil (E253 or E254)

***Personnel Required:***
Electrical Repairer
Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Off Helicopter Task



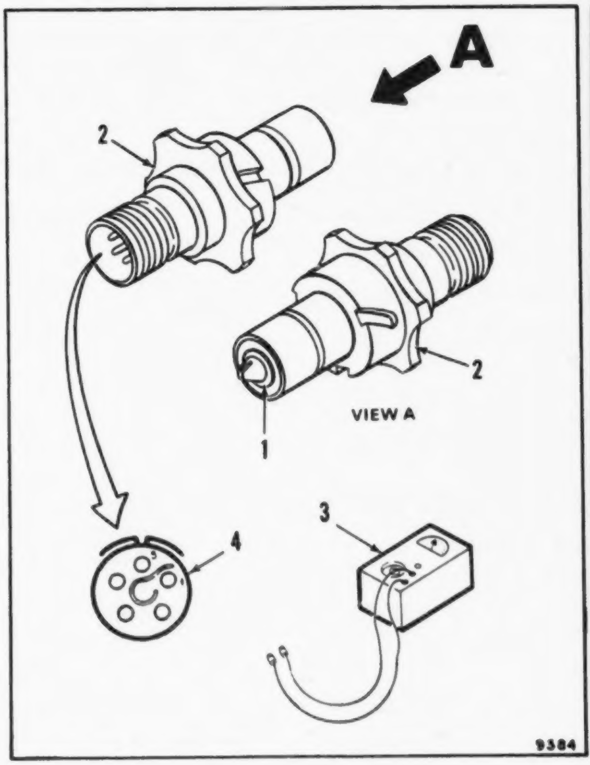
### *TEST CHIP DETECTOR*

1. **Test magnetism of tip (1)** of chip detector plug (2). Tip shall lift a 1/4-20 or 28 steel hex nut.
2. Set range of multimeter (3) to measure resistance.
3. **Bridge the gap** between chip detector ring (4) and body of plug (2). Use a screwdriver or similar tool.
4. **Connect the two test leads** of multimeter (3) **to pins** of connector (4) **in the order shown below.** Check that multimeter indicates open (500,000 ohms or more) or closed (not more than 2 ohms).

| *Pin and Pin* | | | *Pin and Pin* | | |
|---|---|---|---|---|---|
| 1 | 2 | Closed | 2 | 3 | Closed |
| 1 | 3 | Closed | 2 | 4 | Open |
| 1 | 4 | Open | 3 | 4 | Open |

5. Remove tool from gap. Touch one test lead of multimeter (3) to body (2). Connect the other lead to connector pins 1 through 4 in the order shown below:

| *Pin* | | *Pin* | |
|---|---|---|---|
| 1 | Open | 3 | Closed |
| 2 | Closed | 4 | Open |



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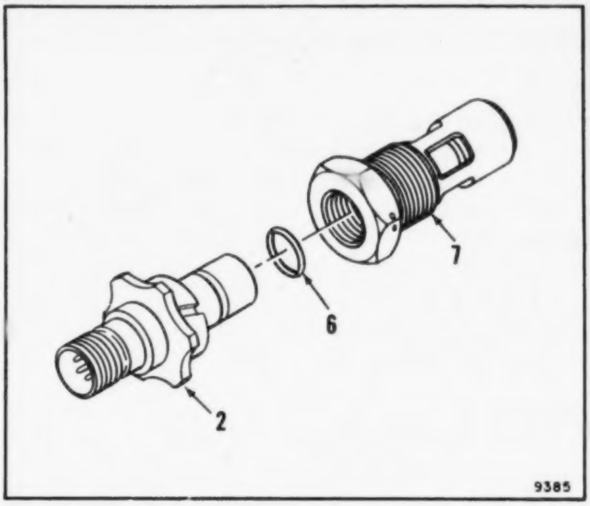
## 6-207.1 FUNCTIONAL TEST OF ENGINE TRANSMISSION CHIP DETECTOR AND TEMPERATURE TRANSMITTER (Continued) 6-207.1

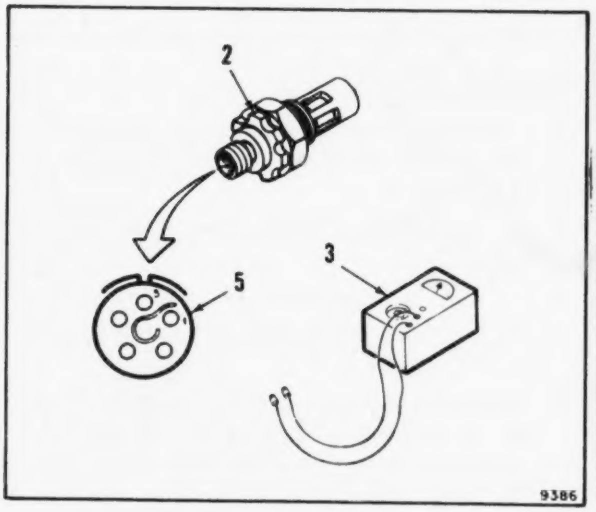
***TEST TEMPERATURE TRANSMITTER***

6. Coat packing (6) and thread of plug (2) with oil (E253 or E254). **Install packing on plug.**
7. **Screw plug (2) into temperature transmitter (7).** Torque to 43 pound-inches.



8. **Connect the two test** leads of multimeter (3) **to pins** of connector (4) **in the order shown below. Check that multimeter indicates open** (500,000 ohms or more) **or closed** (no more than 2 ohms ) as follows:

| *Pin and Pin* | | | *Pin and Pin* | | |
|---|---|---|---|---|---|
| 1 | 2 | Open | 2 | 3 | Closed |
| 1 | 3 | Open | 2 | 4 | Open |
| 1 | 4 | Open | 3 | 4 | Open |



FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-207.2 HIGH TEMPERATURE TEST OF ENGINE TRANSMISSION TEMPERATURE TRANSMITTER 6-207.2

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Electrical Repairer's Tool Kit, NSN 5180-00-323-4915

Exhaust Gas Temperature Tester, BH112JB-53

Heater Probe, BH22223

Multimeter

***Materials:***

None

***Personnel Required:***

Electrical Repairer

***References:***

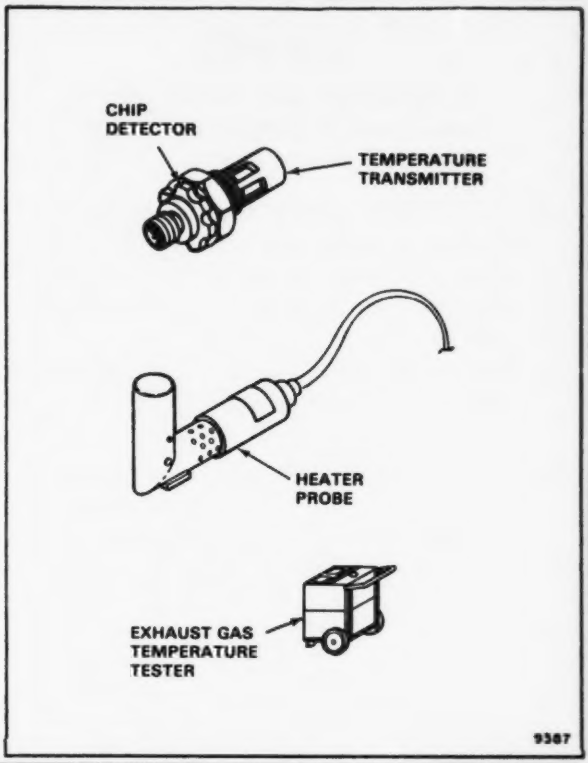
TM 55-4920-401-13 & P

TM 55-1520-240-20P

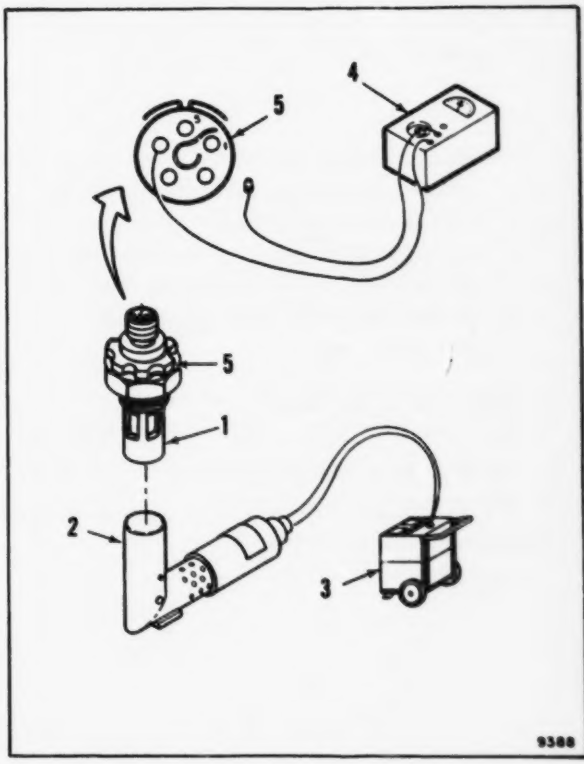
***Equipment Condition:***

Off Helicoper Task

Chip Detector Installed in Temperature Transmitter (Task 6-207.1)



1. **Connect temperature transmitter (1) to heater probe (2). Connect probe to exhaust gas temperature tester (3).** (Refer to TM 55-4920-401-13 & P.)
2. Set multimeter (4) to measure resistance. **Connect one test lead** of multimeter **to pin 4** of chip detector (5). Connect the other lead to pin 3.
3. Set controls of tester (3) for 374°F. Set MASTER POWER switch to ON and TEMPERATURE switch to OPERATE. Check that multimeter indicates open (500,000 ohms or more) at all temperatures up to 374°F.



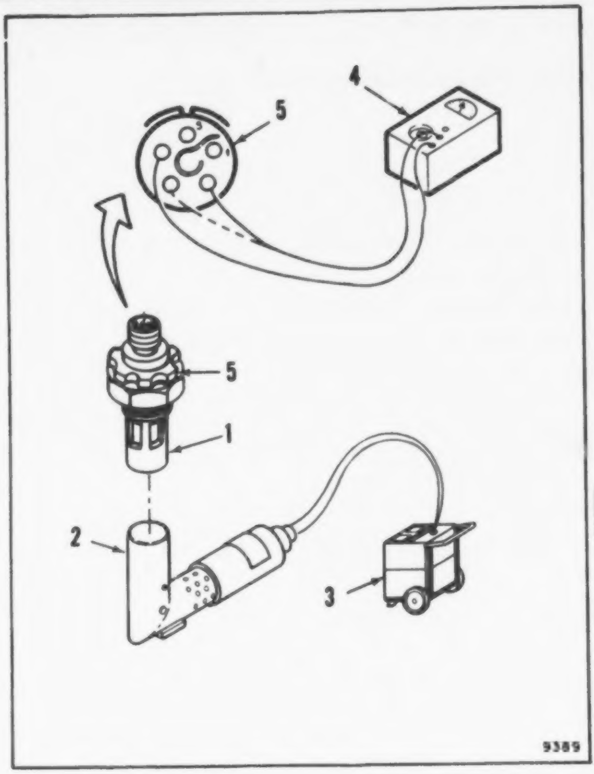
**GO TO NEXT PAGE**

## 6-207.2 HIGH TEMPERATURE TEST OF ENGINE TRANSMISSION TEMPERATURE TRANSMITTER (Continued) 6-207.2

**CAUTION**

**Temperature over 430°F (221°C) can damage temperature transmitter or heater probe.**

4. Using PROBE CONTROL on tester (3), **increase temperature** from 374°F to 405°F. Multimeter shall indicate a closed circuit (2 ohms or less) by the time the unit reaches 405°F.
5. **Lower temperature** to 374°F. Multimeter shall indicate open circuit (500,000 ohms or more) when unit cools to 374°F or lower.
6. Turn PROBE CONTROL on tester (3) fully counterclockwise. **Turn** FUNCTION SELECT and MASTER POWER **switches OFF.**



7. Remove test leads of multimeter (4) from chip detector (5).

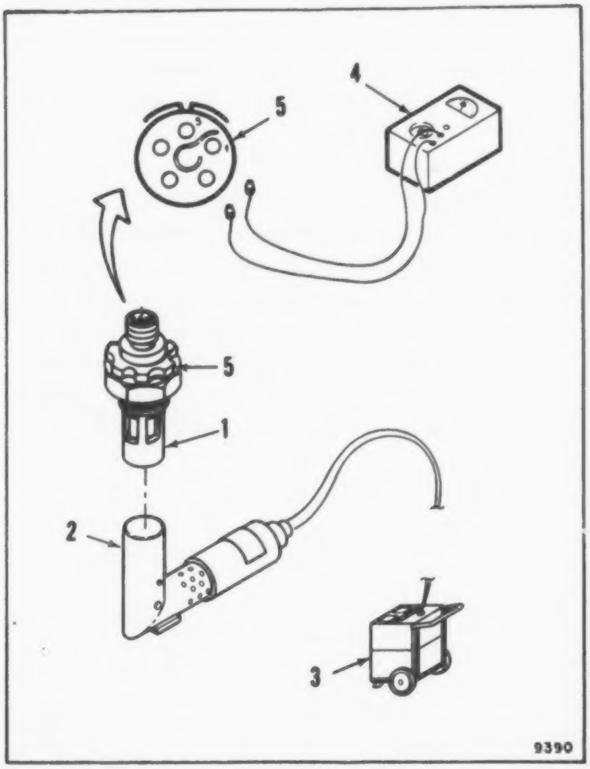
**WARNING**

**Allow heater probe to cool before removing temperature transmitter. Hot probe can burn hands and fingers. If personnel are burned while handling hot probe, seek medical attention immediately.**

8. **Remove temperature transmitter (1)** and chip detector (5) from heater probe (2).
9. **Disconnect heater probe (2)** from tester (3).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-208 INSTALL ENGINE TRANSMISSION TEMPERATURE AND CHIP DETECTOR 6-208

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Torque Wrench, 0 to 150 Inch-Pounds

Modified Socket (E54)

***Materials:***

Lockwire (E231)

***Parts:***

Preformed Packing

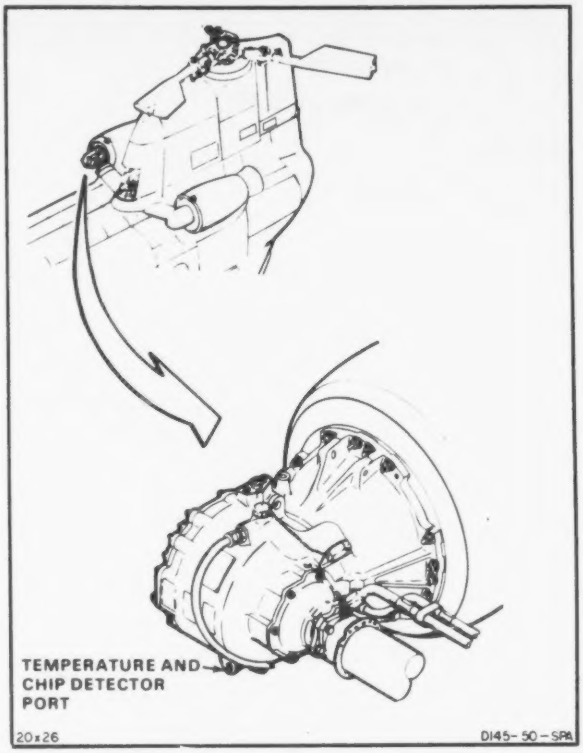
***Personnel Required:***

Medium Helicopter Repairer

Inspector

***References:***

TM 55-1520-240-23P



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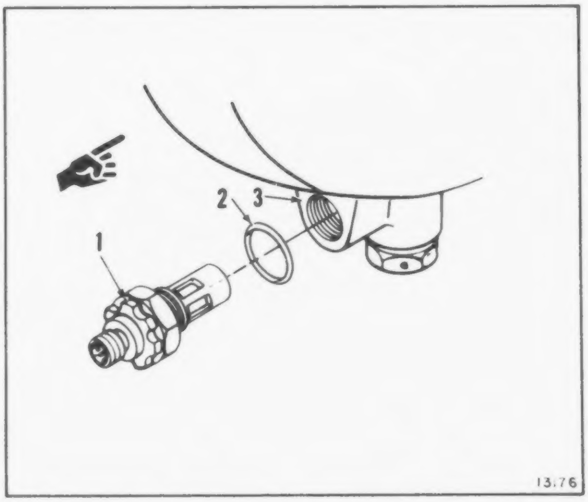
**NOTE**

Procedure is same to install temperature and chip detector on left or right engine transmission. Right transmission is shown here.

1. **Install detector (1)** and packing (2) in port (3). **Torque detector to 90 inch-pounds. Use modified socket (E54)**



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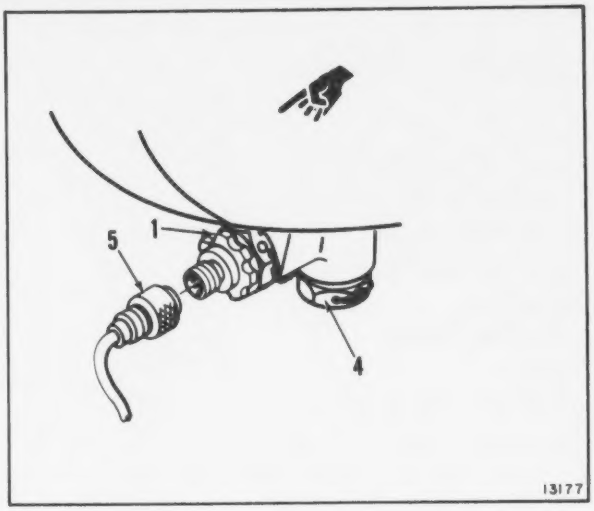
## 6-208 INSTALL ENGINE TRANSMISSION TEMPERATURE AND CHIP DETECTOR (Continued) 6-208

2. **Lockwire detector (1)** to drain plug (4). Use lockwire (E231).
3. **Connect cable plug (5).**

***INSPECT***



FOLLOW-ON MAINTENANCE:

Perform operational check of chip detector (TM 55-1520-240-T).

Service engine transmission (Task 1-54).

Install engine transmission fairing (Task 4-73).

Install engine air inlet fairing (Task 4-75).

**END OF TASK**

## 6-209 REMOVE ENGINE TRANSMISSION INLET SCREEN 6-209

INITIAL SETUP

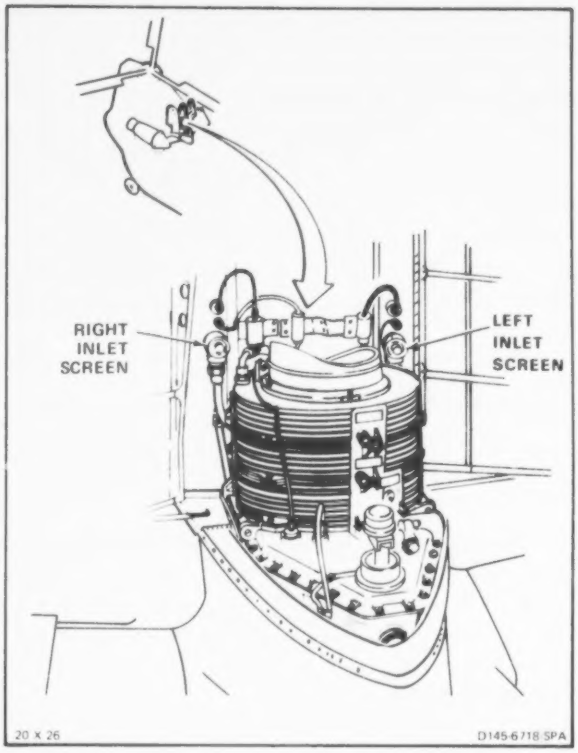
***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692

***Materials:***
Barrier Material (E80)
Masking Tape (E388)

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)



**NOTE**

Procedure is same to remove left or right engine transmission inlet screen. Removal of right screen is shown here.

1. Remove lockwire from screen (1).

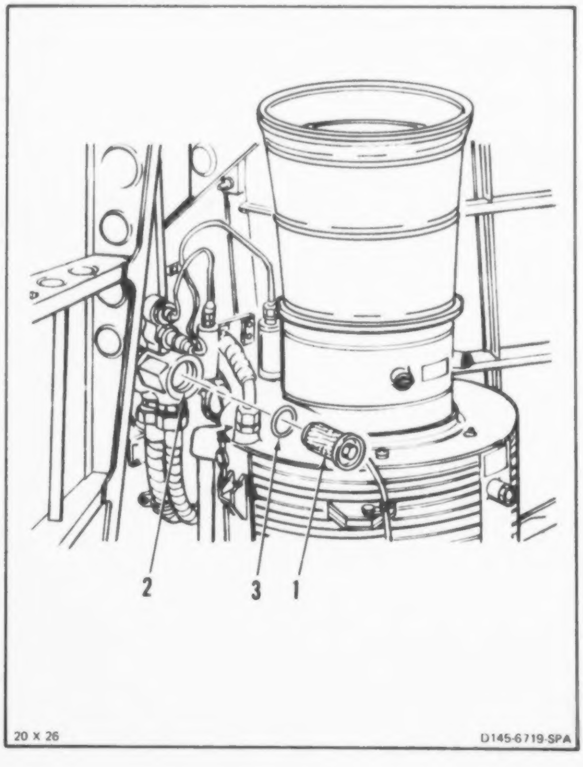
**CAUTION**

**If debris enters screen housing, transmission can be damaged.**

2. **Remove screen (1)** from housing (2). Cover opening in housing with barrier material (E80) and masking tape (E388).
3. Remove packing (3) from screen (1).

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-210 INSPECT ENGINE TRANSMISSION INLET SCREEN

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
None

***Materials:***
Brush (E86)

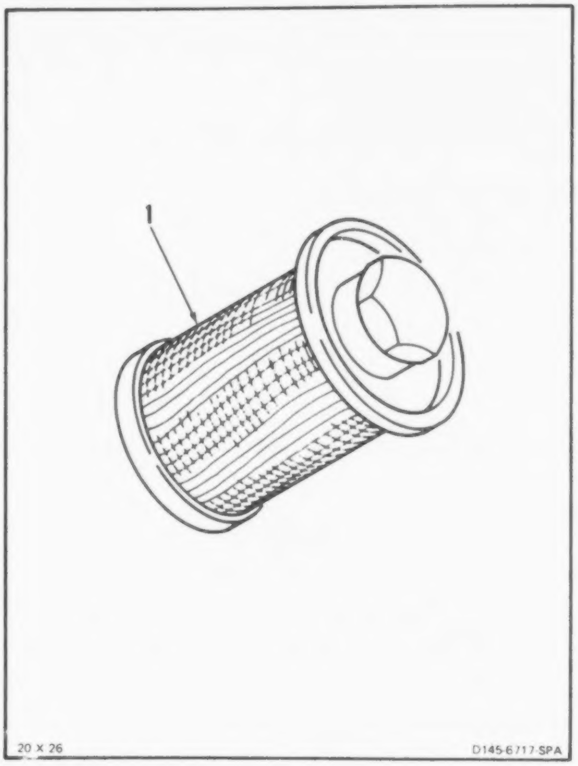
***Personnel Required:***
67U10 Medium Helicopter Repairer

***Equipment Condition:***
Off Helicopter Task

1. **Check screen (1)** for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108). If debris is found, reject screen.
2. **Inspect screen (1) for tears.** There shall be no tears.

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-211 INSTALL ENGINE TRANSMISSION INLET SCREEN 6-211

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packing

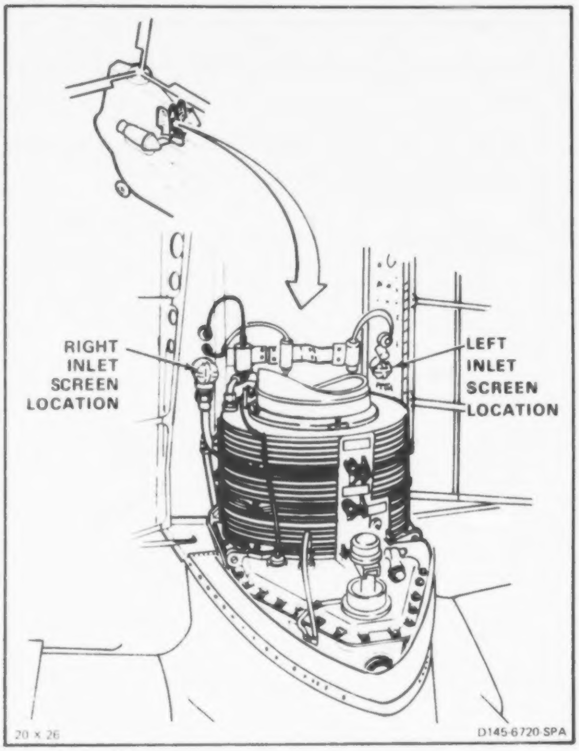
***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***Equipment Condition:***
Engine Transmission Inlet Screen Inspected (Task 6-210)

***References:***
TM 55-1520-240-23P

**NOTE**

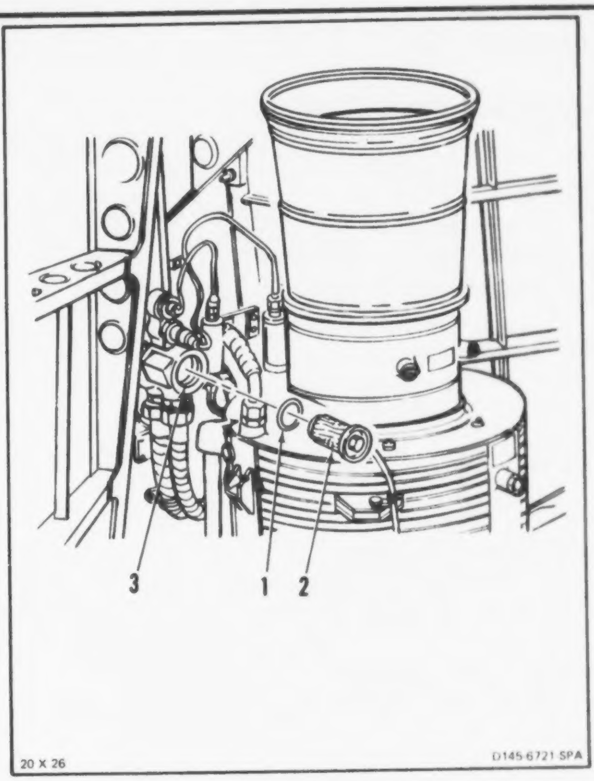
Procedure is same to install left or right engine transmission screen. Installation of right screen is shown here.


RIGHT INLET SCREEN LOCATION
LEFT INLET SCREEN LOCATION
20 x 26
D145-6720-SPA

**GO TO NEXT PAGE**

## 6-211 INSTALL ENGINE TRANSMISSION INLET SCREEN (Continued) 6-211

1. Coat packing (1) and thread of screen (2) with oil (E254). Install packing on screen.
2. Remove tape and barrier material from cavity (3).
3. Install screen (2) in cavity (3). **Torque screen to 80 inch-pounds.**

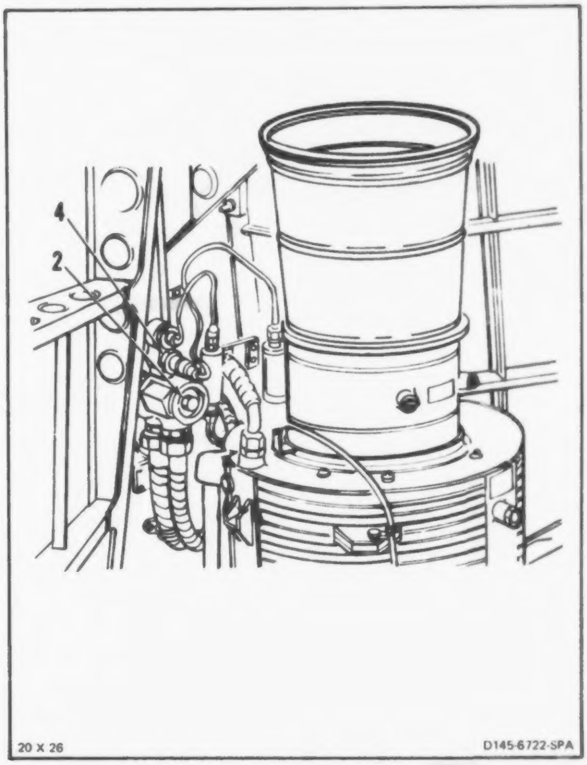


4. Lockwire screen (2) to oil pressure switch (4). Use lockwire (E231).

***INSPECT***

FOLLOW-ON MAINTENANCE:

Close aft pylon access doors (Task 2-2).



**END OF TASK**

## 6-212 REPLACE ENGINE TRANSMISSION SIGHT GAGE 6-212

INITIAL SETUP

***Applicable Configurations:***
All

***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Container, 2-Quart (2)
Hose, 1-Inch id, 24 Inches Long
Spanner Wrench
Torque Wrench, 30 to 150 Inch-Pounds

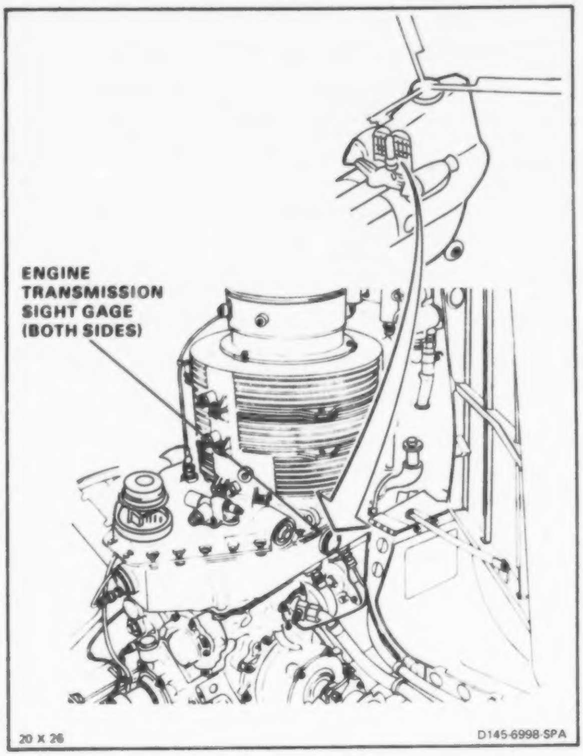
***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packing

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Aft Pylon Access Doors Open (Task 2-2)
Aft Pylon Lower Fairing Removed (Task 2-2)



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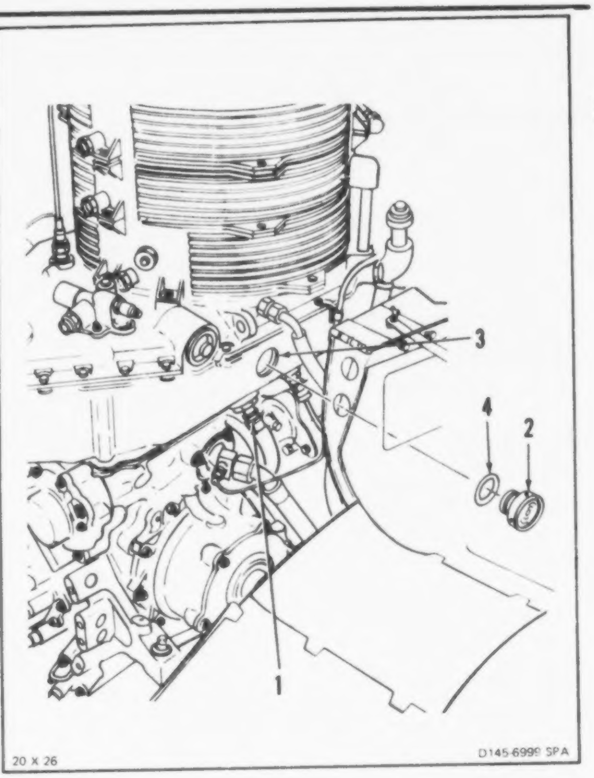
## 6-212 REPLACE ENGINE TRANSMISSION SIGHT GAGE (Continued)

**NOTE**

Procedure is same to remove left or right engine transmission sight gage. Left gage is shown here.

*REMOVE GAGE*

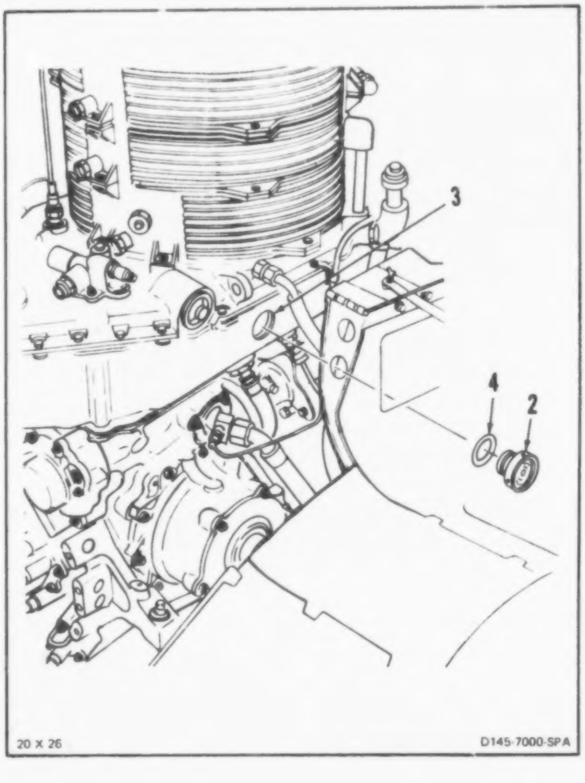
1. **Connect hose** to drain valve (1). Direct end of hose into container.
2. Push in drain valve (1), twist, and pull. **Drain oil** until oil level is below sight gage (2).
3. Close drain valve (1) by pushing it in and twisting it. Disconnect hose from valve.
4. Remove lockwire from sight gage (2). **Remove gage** from sump (3). Use spanner wrench.



5. Remove packing (4) from sight gage (2).

*INSTALL GAGE*

6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. **Install sight gage (2)** in sump (3). Use spanner wrench. **Torque gage to 80 inch-pounds.**



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## 6-212 REPLACE ENGINE TRANSMISSION SIGHT GAGE (Continued) 6-212

8. Lockwire sight gage (2) to drain valve (1). Use lockwire (E231).

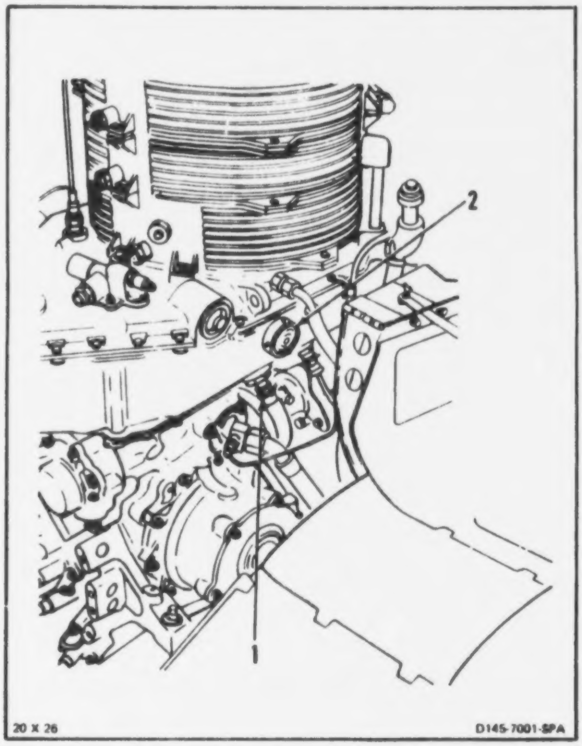
***INSPECT***

FOLLOW-ON MAINTENANCE:

Service engine transmission (Task 1-54).

Install aft pylon lower fairing (Task 2-2).

Close aft pylon access doors (Task 2-2).



**END OF TASK**

## 6-212.1 REPLACE RIGHT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE 6-212.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Funnel
Container, 2-Quart
Hose, 1 Inch id X 36 Inches Long

***Materials:***

Cloths (E120)
Oil (E254)
Lockwire (E231)

***Parts:***

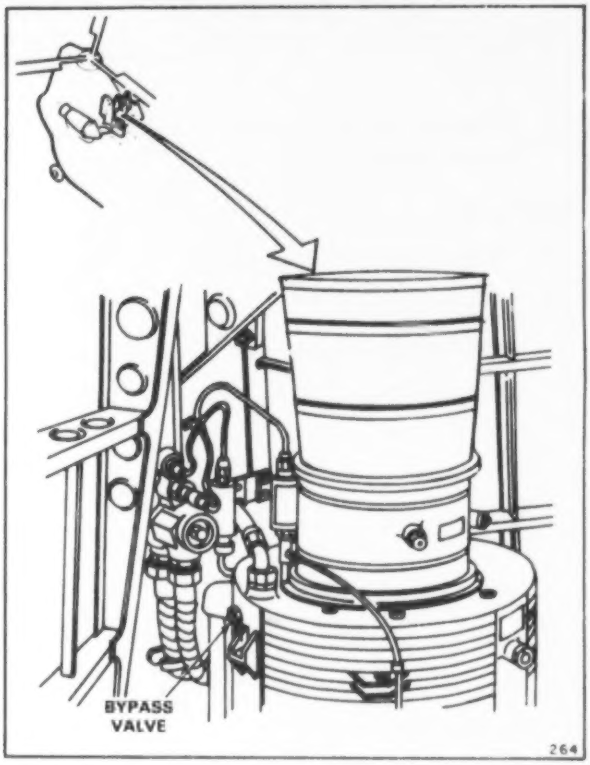
Packing

***Personnel Required:***

Medium Helicopter Repairer
Inspector

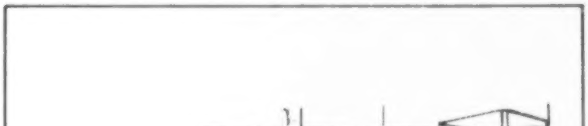
***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



***DRAIN OIL COOLER***

1. Remove lockwire from drain plug (1).
2. **Remove drain plug (1)** and packing (2) from oil cooler (3). Place funnel under port (4). **Drain oil** through funnel into container.
3. Install plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



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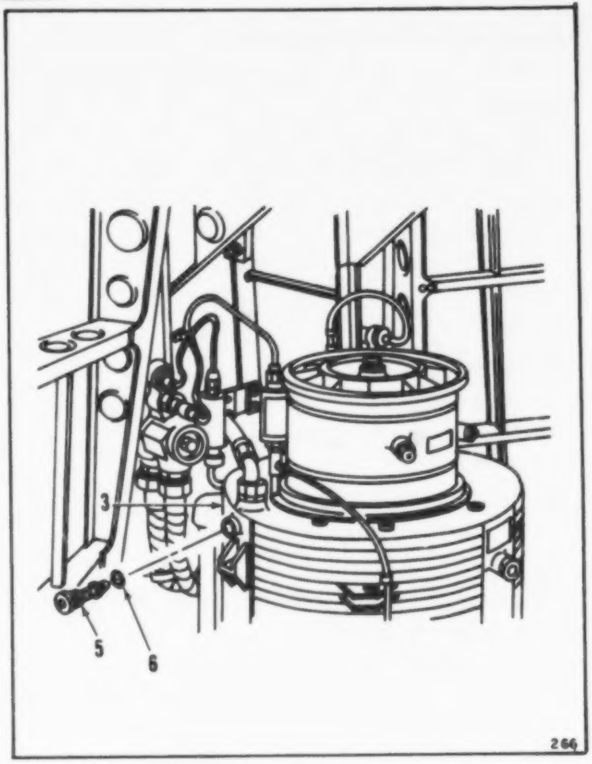
## 6-212.1 REPLACE RIGHT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-212.1

***REMOVE VALVE***



**NOTE**

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). **Remove valve** from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).

***INSTALL VALVE***

**WARNING**

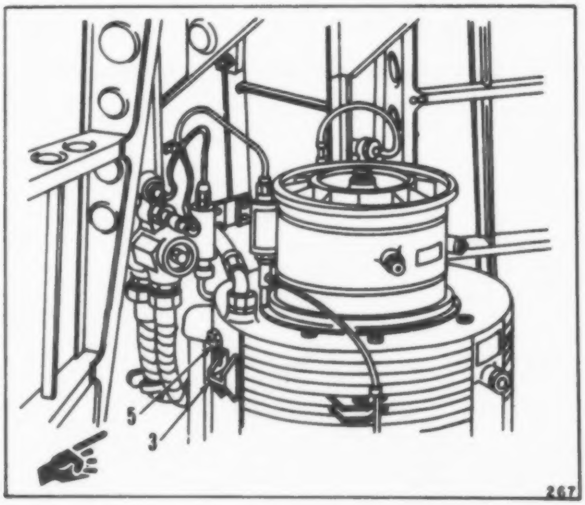
**Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

**Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**

6. Coat packing (6) and thread of bypass valve (5) with oil (E254). Install packing on valve.
7. Install valve (5) in oil cooler (3).

8. Lockwire valve (5) to oil cooler (3). Use lockwire (E231).



***INSPECT***

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

***GO TO NEXT PAGE***

## 6-213 REMOVE RIGHT ENGINE TRANSMISSION OIL COOLER 6-213

INITIAL SETUP

***Applicable Configurations:***
All

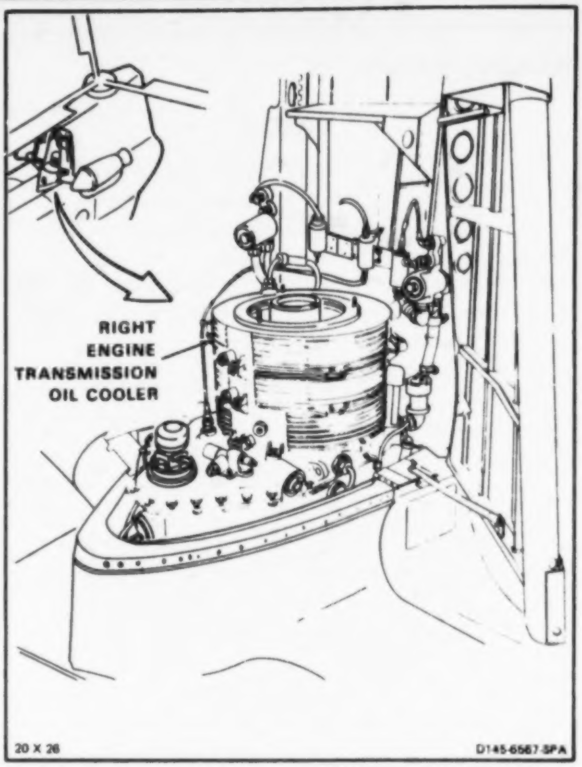
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 5/8-Inch
Funnel
Container, 2-Quart

***Materials:***
Cloths (E120)

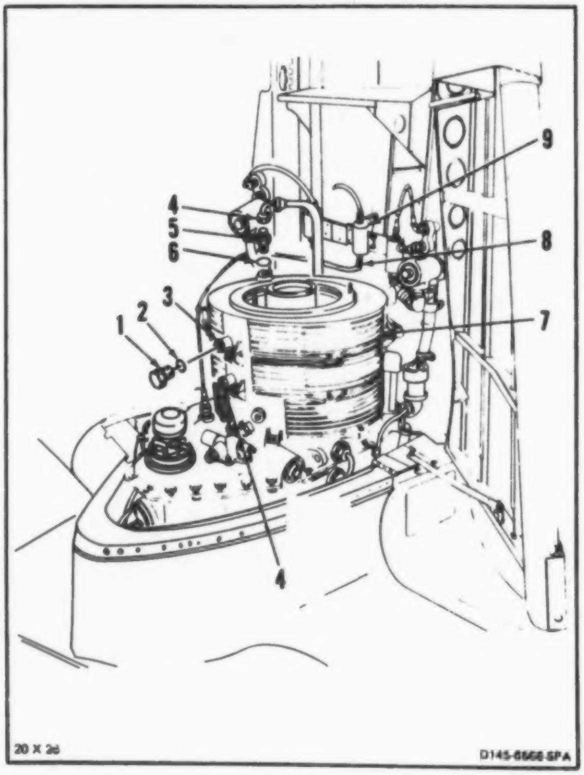
***Parts:***
Packing

***Personnel Required:***
Medium Helicopter Repairer

***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)



1. Remove lockwire from drain plug (1).
2. **Remove drain plug (1)** and packing (2). Place funnel under port (3). **Drain oil** through funnel into container.
3. **Install drain plug (1)** and packing (2).
4. **Disconnect oil hose (4)** from reducer (5). **Remove reducer** and packing (6) from cooler (7).
5. **Disconnect oil hole (8)** from pressure transmitter (9).



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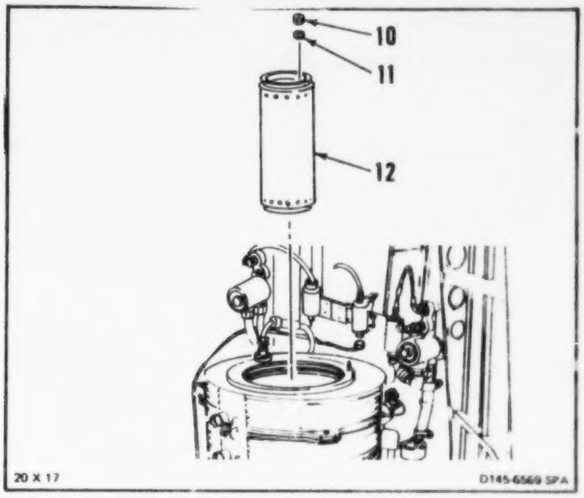
## 6-213 REMOVE RIGHT ENGINE TRANSMISSION OIL COOLER (Continued) 6-213

6. Remove four nuts (10) and washers (11) from baffle (12). **Remove baffle.**


10
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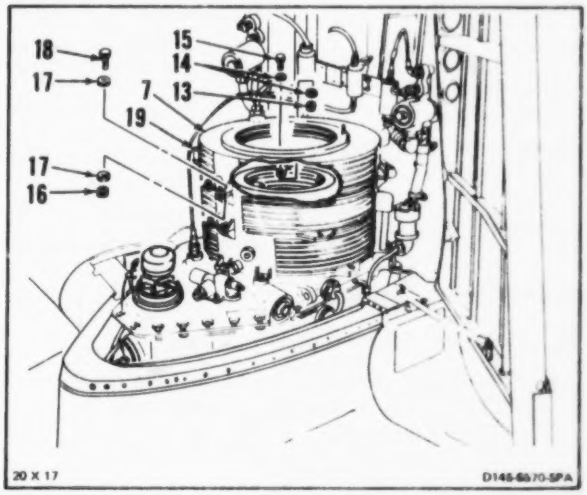
12
20 X 17
D145-6569 SPA

7. **Remove** nuts (13), washers (14), and **bolts (15)** from three places around inside of cooler (7).
8. **Remove** nuts (16), washers (17), and **bolts (18)** from six places around outside of cooler (7). **Remove bracket (19).**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D145-6570-SPA

**NOTE**

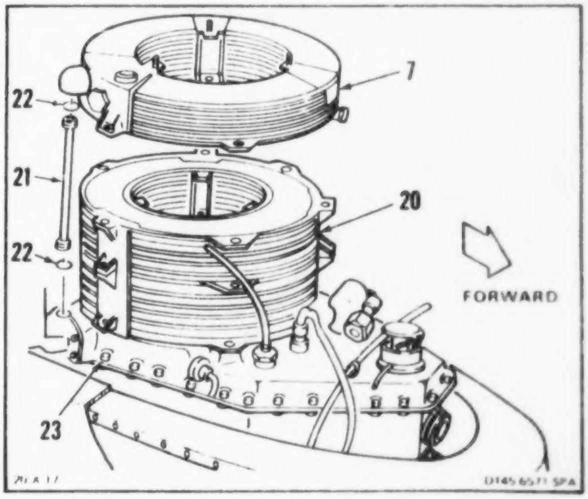
Do not tilt cooler when lifting it. Oil can spill.

9. **Lift cooler (7) straight up and away** from cooler (20) and oil transfer tube (21).

**NOTE**

Transfer tube may stay in cooler.

10. **Remove transfer tube (21)** and two packings (22) from sump cover (23).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FORWARD
23
20 X 17
D145 6571 SPA

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-213.1 REPLACE LEFT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE 6-213.1

INITIAL SETUP

***Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Container, 2-Quart
Hose, 1-Inch ID, 36 Inches Long
Funnel

***Materials:***

Cloths (E120)
Lockwire (E231)
Oil (E254)

***Parts:***

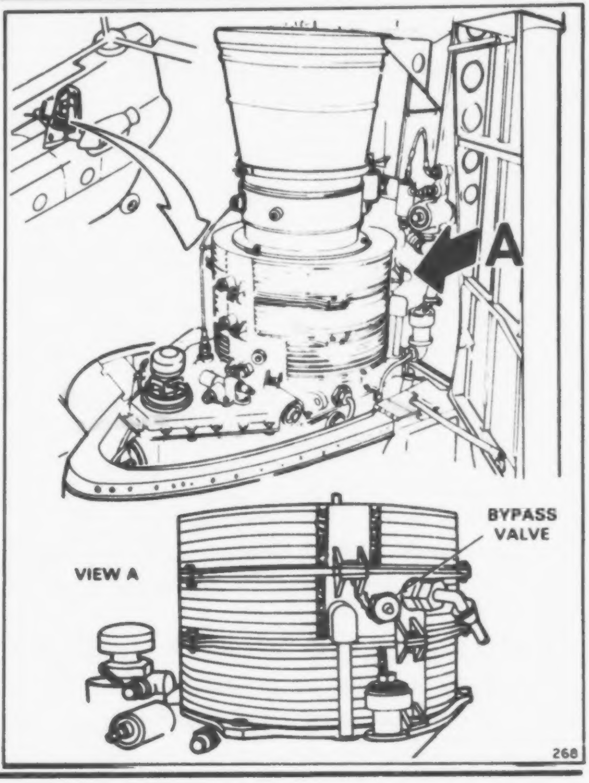
Packings (2)

***Personnel Required:***

Medium Helicopter Repairer
Inspector

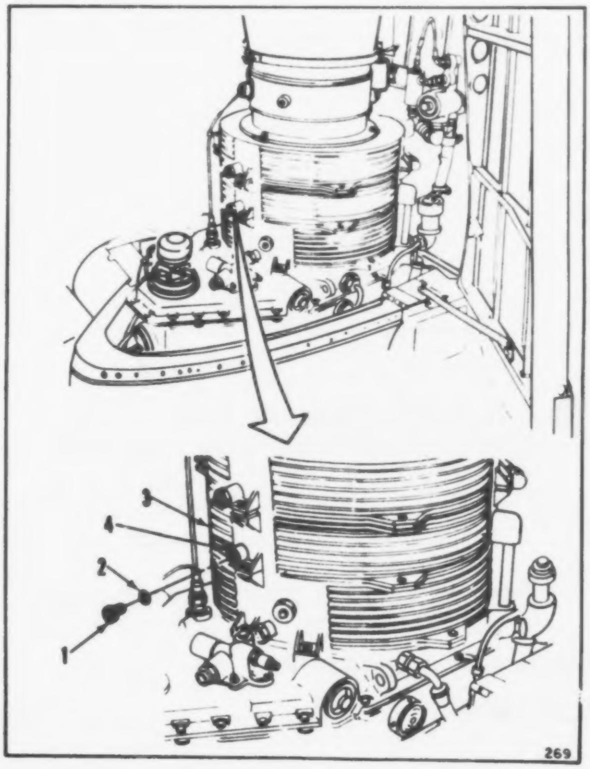
***Equipment Condition:***

Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)



***DRAIN OIL COOLERS***

1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2) from oil cooler (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
3. Install drain plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



*GO TO NEXT PAGE*

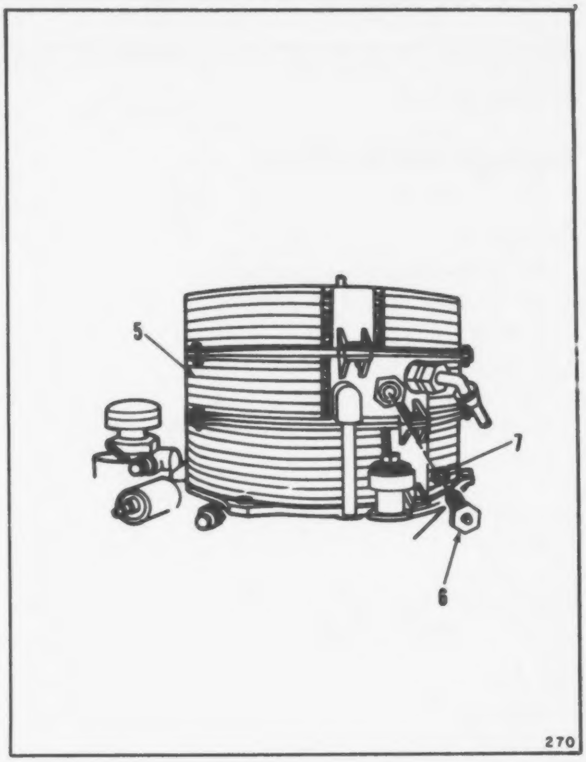
## 6-213.1 REPLACE LEFT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE (Continued) 6-213.1

### *REMOVE VALVE*

**NOTE**

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (6). **Remove valve** from oil cooler (5). Use cloths (E120) to absorb spillage.
5. Remove packing (7) from valve (6).



### *INSTALL VALVE*

**WARNING**

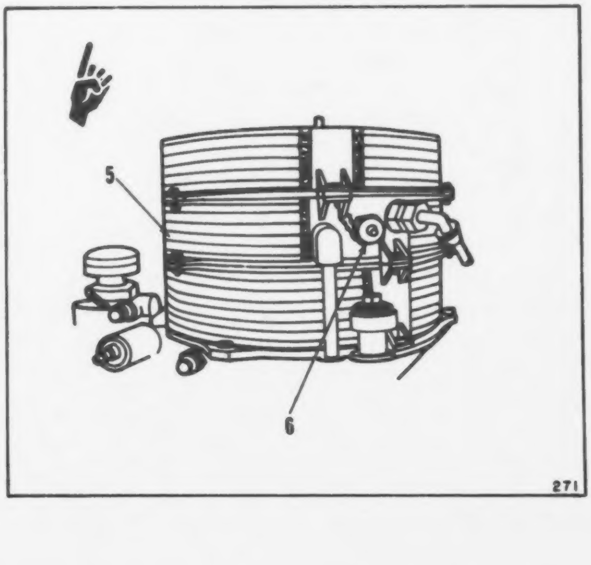
**Oil (254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.**

**WARNING**

**Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.**

6. Coat packing (7) and thread of bypass valve (6) with oil (E254). Install packing on valve.
7. Install valve (6) in oil cooler (5). Torque valve to 80 inch-pounds.

8. Lockwire valve (6) to oil cooler (5). Use lockwire (E231).



### *INSPECT*

FOLLOW-ON MAINTENANCE:

Service combining transmission (Task 1-54).

Close aft pylon doors (Task 2-2).

**END OF TASK**

## 6-214 REMOVE LEFT ENGINE TRANSMISSION OIL COOLER 6-214

INITIAL SETUP

***Applicable Configurations:***
All

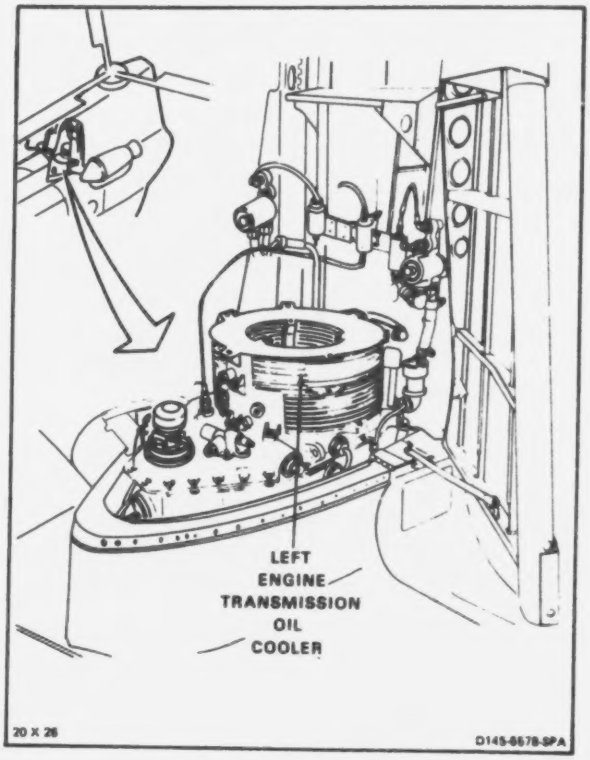
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, 1-Inch
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 5/8-Inch
Funnel
Container, 2-Quart

***Materials:***
None

***Personnel Required:***
67U10 Medium Helicopter Repairer

***Parts:***
Packing

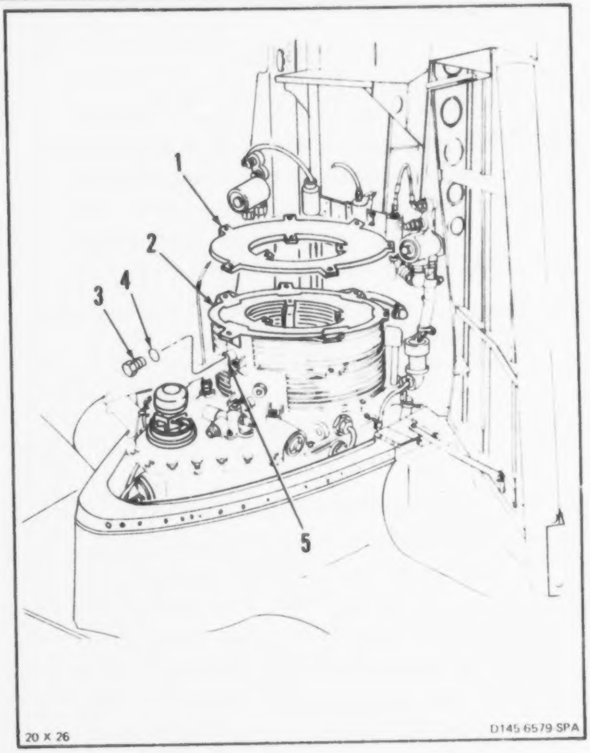
***Equipment Condition:***
Battery Disconnected (Task 1-39)
Electrical Power Off
Pylon Hinged Fairing Open (Task 2-2)
Oil Cooler Fan and Shaft Removed (Task 6-182)
Right Engine Transmission Oil Cooler Removed (Task 6-213)



***GO TO NEXT PAGE***

## 6-214 REMOVE LEFT ENGINE TRANSMISSION OIL COOLER (Continued) 6-214

1. **Remove armor plate (1)** from cooler (2).
2. Remove lockwire from drain plug (3).
3. **Remove drain plug (3)** and packing (4). Place funnel under port (5). **Drain oil** through funnel into container.
4. **Install drain plug (3)** and packing (4).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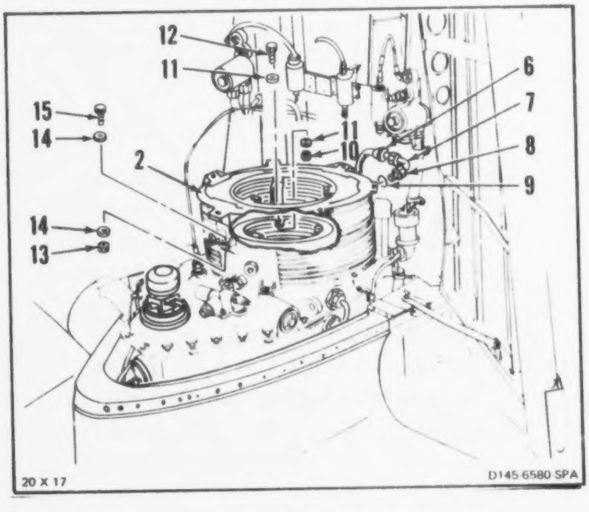
20 X 26
D145 6579 SPA

5. **Disconnect hose (6)** from elbow (7). **Remove elbow (7),** nut (8), and packing (9) and cooler (2).
6. **Remove** nuts (10), washers (11), and **bolts (12)** from three places around inside of cooler (2).
7. **Remove** nuts (13), washers (14), and **bolts (15)** from six places around outside of cooler (2).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D145 6580 SPA

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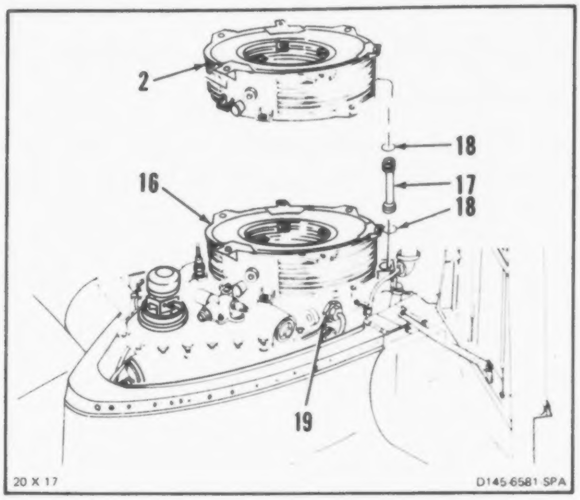
## 6-214 REMOVE LEFT ENGINE TRANSMISSION OIL COOLER (Continued) 6-214



**NOTE**

Do not tilt cooler. Oil can spill.

8. **Lift cooler (2) straight up and away** from cooler (16) and oil transfer tube (17).

**NOTE**

Transfer tube may stay in cooler.

9. **Remove transfer tube (17)** and two packings (18) from sump cover (19).

FOLLOW-ON MAINTENANCE:

None

**END OF TASK**

## 6-214.1 REPAIR ENGINE TRANSMISSION OIL COOLER OUTSIDE SURFACE

INITIAL SETUP

*Applicable Configurations:*
All

*Tools:*
Dial Indicating Depth Gage 643J
Goggles

*Materials:*
Naphtha (E245)
Emery Cloth (E123) or
Abrasive Paper (E13)
Crocus Cloth (E122)
Cloths (E120)
Gauze Sponges (E184)
Gloves (E186)
Acetic Acid (E21)
Alodine Powder (E65)
Epoxy Primer (E293)
Black Lacquer Topcoat (E215)

*Personnel Required:*
Aircraft Powertrain Repairer
Inspector

*References:*
TM 43-0103
MIL-C-5541
MIL-C-22751

*Equipment Condition:*
Off Helicopter Task

*General Safety Instructions:*

**WARNING**

**Naphtha (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**WARNING**

**Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.**

**CAUTION**

**Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.**

*GO TO NEXT PAGE*

## 6-214.1 REPAIR ENGINE TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued) 6-214.1

**NOTE**

Repairable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. **Clean** oil and grease from **damaged area.** Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. **Check** extent and location of **damage** on cooler (1):

   **NOTE**

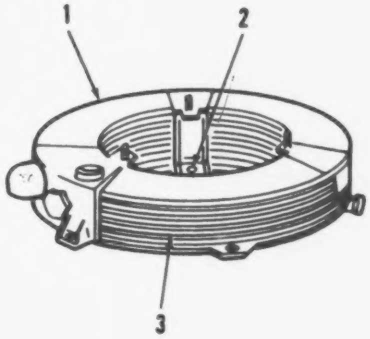
   Dimensions in this step refer to extent of damage after rework.

   a. **Depth of damage shall not be more than 0.025 inch.**

   b. **Damage shall not extend over more than one surface or enter any radius.**

   c. **Damage shall not be closer than 1.00 inch to any mounting hole (2).**

   d. **More than 3 inches of fins (2) shall not be crushed beyond straightening.**
3. **Fluorescent inspect** damaged area to check for cracks (TM 43-0103). **There shall be no cracks.**
4. **Blend out damage** with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
5. **Smooth blended area** with crocus cloth (E122). Do not leave any sharp edges.



20 X 34

0145-12514-SPA

*GO TO NEXT PAGE*

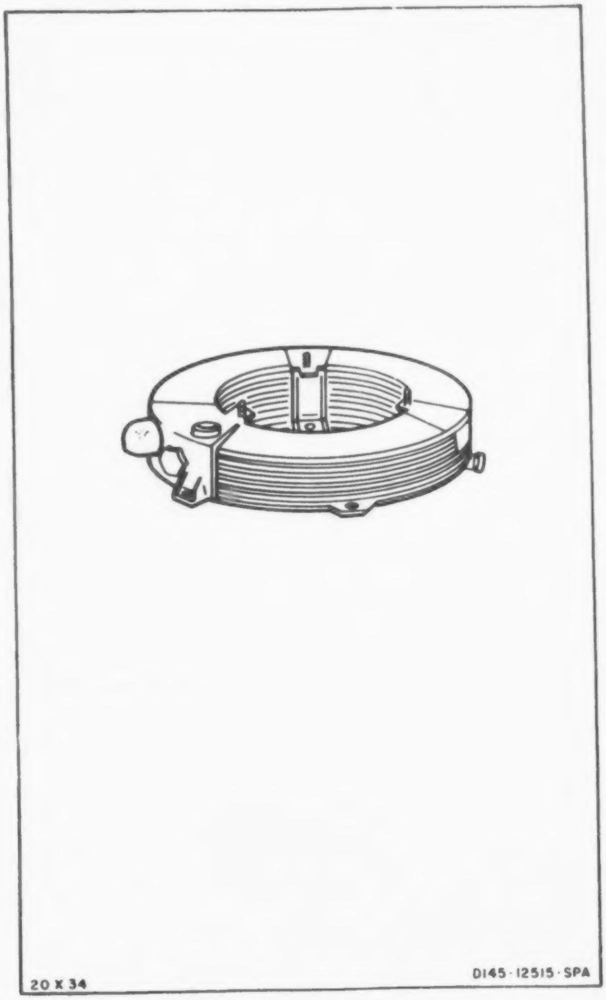
## 6-214.1 REPAIR ENGINE TRANSMISSION OIL COOLER OUTSIDE SURFACE (Continued) 6-214.1

6. Acid-etch reworked area as follows:
   a. **Prepare solution of 3 parts acetic acid (E21) in 7 parts water. Wear gloves (E186) and goggles.**
   b. **Swab area with solution for 2 minutes. Use gauze sponges (E184).**
   c. **Rinse area with cold water.**
7. **Fluorescent inspect** reworked area to check for cracks (TM 43-0103). **There shall be no cracks.**
8. **Clean** reworked area **with naphtha (E245)** and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. **Swab on solution of alodine powder (E65) and water (MIL-C-5541). Use gauze sponges (E184).** Swab for 2 to 5 minutes. Rinse area with cold water and let air dry.
10. **Apply epoxy primer (E293)** to reworked area. Let air dry for 2 hours.
11. **Apply black lacquer topcoat (E215) (MIL-C-22751).**

***INSPECT***

FOLLOW-ON MAINTENANCE:

None



**END OF TASK**

## 6-215 INSTALL LEFT ENGINE TRANSMISSION OIL COOLER 6-215

INITIAL SETUP

***Applicable Configurations:***
All

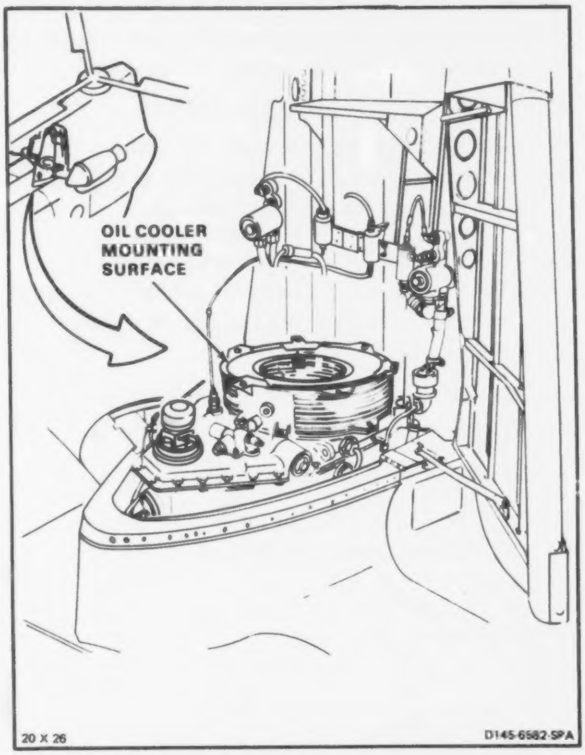
***Tools:***
Aircraft Mechanic's Tool Kit,
NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 5/8-Inch
Crow's Foot, 1 5/8-Inch

***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

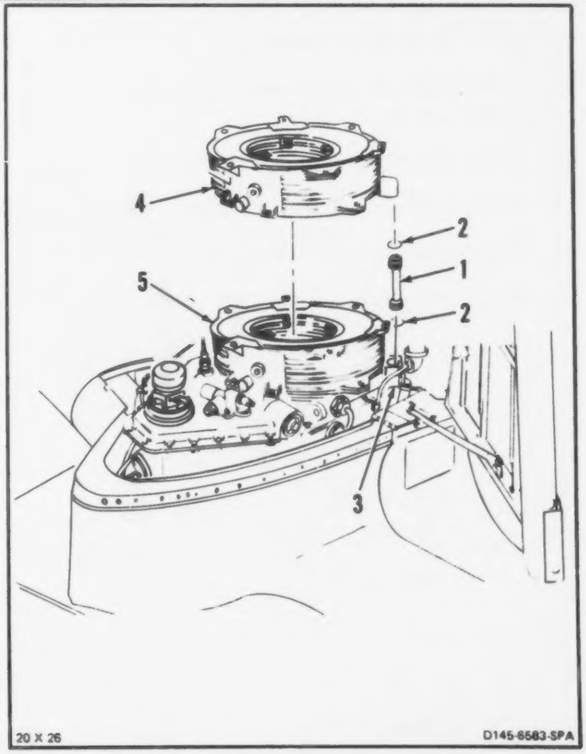

OIL COOLER
MOUNTING
SURFACE
20 X 26
D145-6582-SPA

1. **Install oil transfer tube (1)** and two packings (2) in sump cover (3).

**NOTE**

Do not tilt cooler. Oil can spill.

2. **Install cooler (4)** on cooler (5) and transfer tube (1). Press down firmly to seat cooler on tube.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20 X 26
D145-6583-SPA

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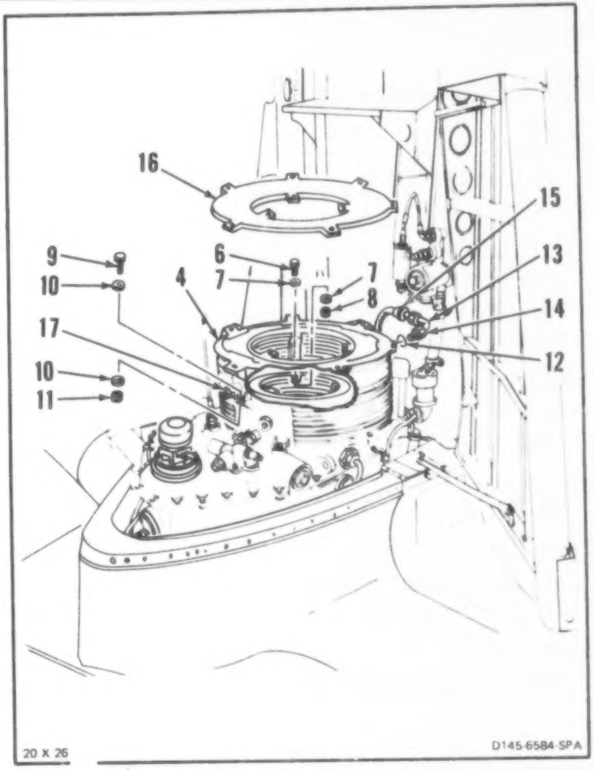
## 6-215 INSTALL LEFT ENGINE TRANSMISSION OIL COOLER (Continued) 6-215

3. **Install bolts (6),** washers (7), and nuts (8) at three places around inside of cooler (4). **Torque nuts to 60 inch-pounds.**
4. **Install bolts (9),** washers (10), and nuts (11) at six places around outside of cooler (4). **Torque nuts to 60 inch-pounds.**
5. Coat packing (12) and thread of elbow (13) with oil (E254). **Install elbow** and packing in cooler (4). **Torque nut (14) to 80 inch-pounds.**
6. Coat thread of hose (15) with oil (E254). **Connect hose** to elbow (13).
7. **Install armor plate (16)** on cooler (4).
8. If drain plug (17) is not lockwired, lockwire plug to cooler (4). Use lockwire (E231).



***INSPECT***

FOLLOW-ON MAINTENANCE:

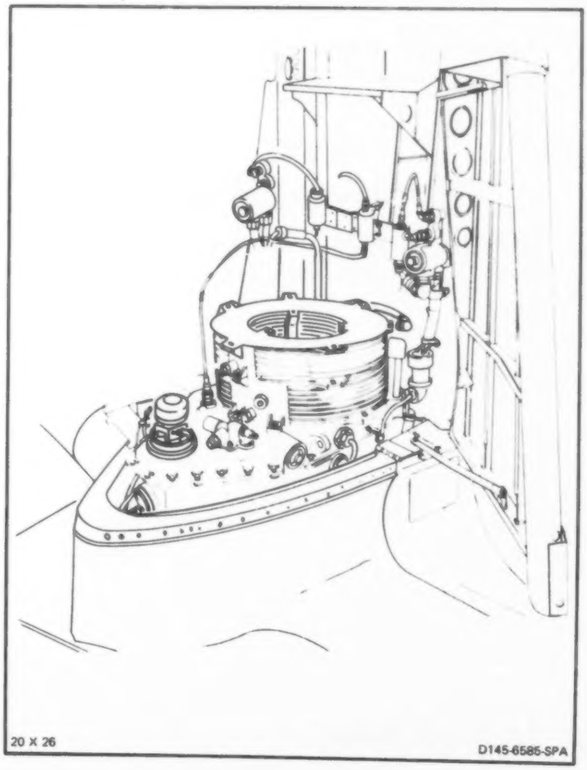
Install right engine transmission oil cooler (Task 6-216).

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission (Task 1-54).

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



**END OF TASK**

## 6-216 INSTALL RIGHT ENGINE TRANSMISSION OIL COOLER 6-216

INITIAL SETUP

***Applicable Configurations:***
All

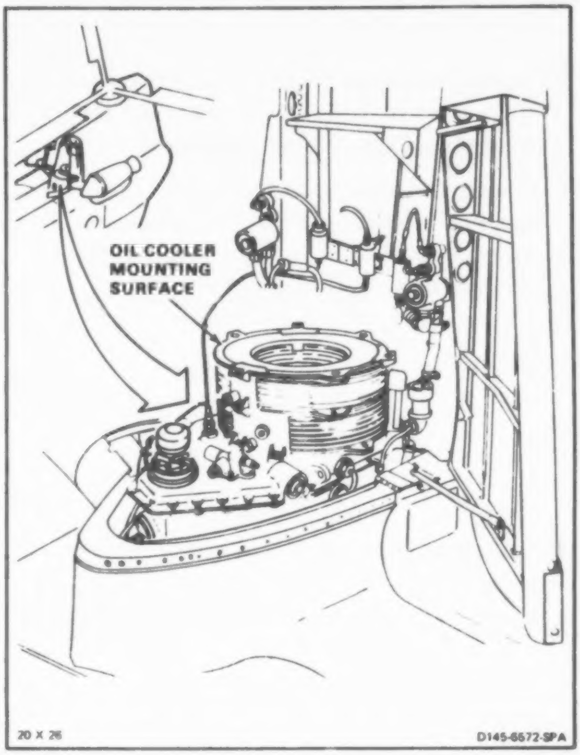
***Tools:***
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Open End Wrench, 1 1/2-Inch
Open End Wrench, 1 5/8-Inch
Crow's Foot, 1 5/8-Inch

***Materials:***
Oil (E254)
Lockwire (E231)

***Parts:***
Packings

***Personnel Required:***
67U10 Medium Helicopter Repairer
67U30 Inspector

***References:***
TM 55-1520-240-23P

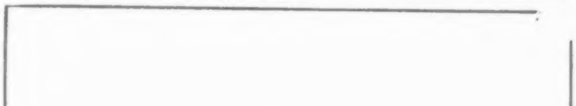

OIL COOLER MOUNTING SURFACE
20 X 26
D145-6572-SPA

1. **Install oil transfer tube (1)** and two packings (2) in sump cover (3).

**NOTE**

Do not tilt cooler. Oil can spill.

2. **Install cooler (4)** on cooler (5) and transfer tube (1). Press down firmly to seat cooler on tube.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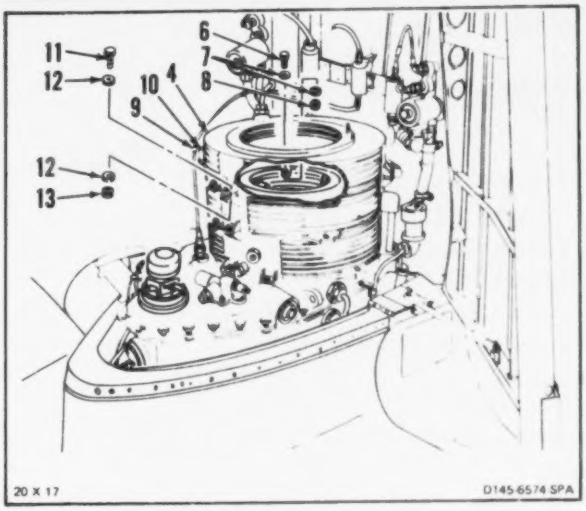
## 6-216 INSTALL RIGHT ENGINE TRANSMISSION OIL COOLER (Continued)

3. **Install bolts (6),** washers (7) and nuts (8) at three places around inside of cooler (4). **Torque nuts to 60 inch-pounds.**
4. Position bracket (9) on mounting lug (10). **Install bolts (11),** washers (12) and nuts (13) at six places around outside of cooler (4). **Torque nuts to 60 inch-pounds.**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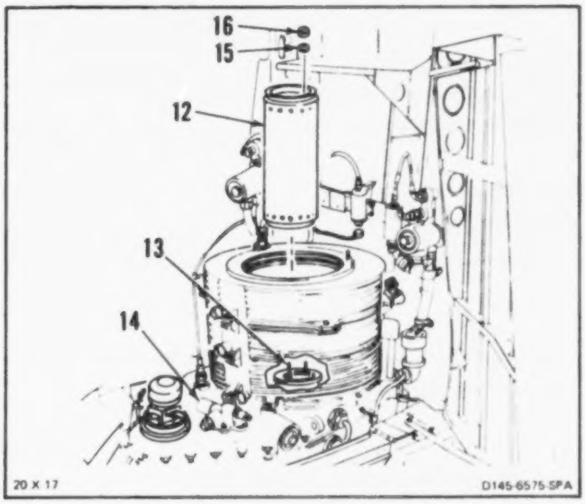
5. **Install baffle (12)** on four studs (13) on sump cover (14). Install washers (15) and nuts (16). **Torque nuts to 60 inch-pounds.**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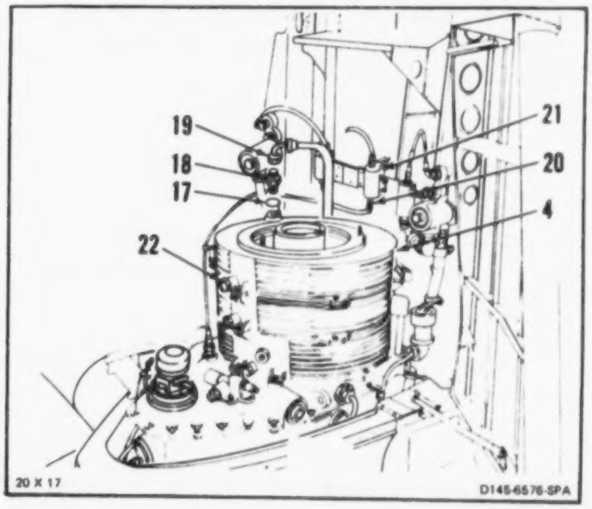
6. Coat packing (17) and thread of reducer (18) with oil (E254). **Install reducer** in cooler (4). **Torque reducer to 80 inch-pounds.**
7. Coat thread of hose (19) with oil (E254). **Connect hose to reducer (18).**
8. **Connect hose (20)** to pressure transmitter (21).
9. If drain plug (22) is not lockwired, lockwire plug to cooler (4). Use lockwire (E231).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D145-6576-SPA

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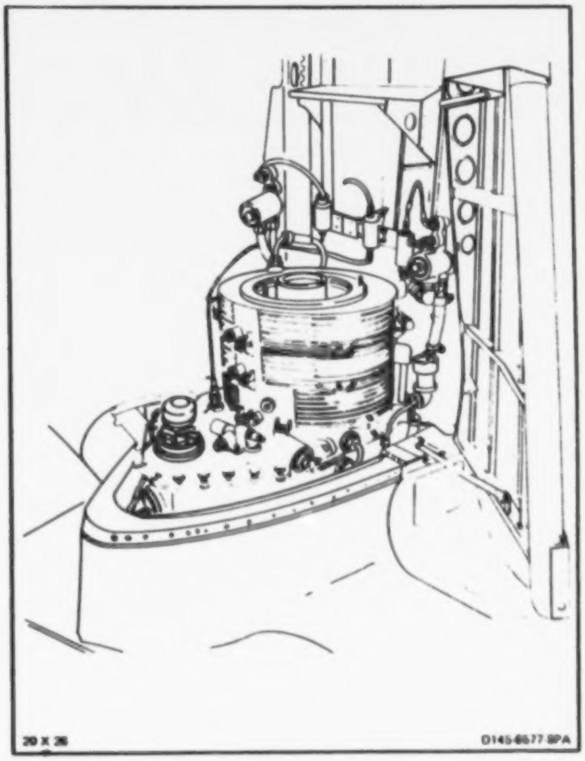
## 6-216 INSTALL RIGHT ENGINE TRANSMISSION OIL COOLER (Continued) 6-216



***INSPECT***

FOLLOW-ON MAINTENANCE:

Install oil cooler fan and shaft (Task 6-186).

Service combining transmission (Task 1-54).

Close pylon hinged fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).

best copy available

**END OF TASK**

**Pages Index-1 thru Index-118 Deleted**

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*Chief of Staff*

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|---|---|---|
| TM 55-1520-240-23-5 | 10 May 83 | Aviation Unit & Intermediate Maintenance Manual, CH-47D |

BE EXACT PIN-POINT WHERE IT IS

| PAGE NO | PARA-GRAPH | FIGURE NO | TABLE NO | IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT: |
|---|---|---|---|---|
| 6 | 2-1 a | | | In line 6 of paragraph 2-1a the manual states the engine has 6 Cylinders. The engine on my set only has 4 Cylinders. Change the manual to show 4 Cylinders. |
| 81 | | 4-3 | | Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the Other. |
| 125 | line 20 | | | I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got What I ordered, so the NSN is Wrong. Please give me a good NSN |

| PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER | SIGN HERE |
|---|---|
| JOHN DOE, PFC (268) 317-7111 | John Doe<br>JOHN DOE |

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DRSTS-M Overprint 1, 1 Nov 80

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REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2,
1 Nov 80

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# The Metric System and Equivalents

*Linear Measure*

1 centimeter = 10 millimeters = .39 inch
1 decimenter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

*Weights*

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

*Liquid Measure*

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 38.82 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

*Square Measure*

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimenter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

*Cubic Measure*

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu meter = 1000 cu. decimeters = 35.31 cu. feet

# Approximate Conversion Factors

| *To change* | *To* | *Multiply by* |
|---|---|---|
| inches | centimeters | 2.540 |
| feet | meters | .305 |
| yards | meters | .914 |
| miles | kilometers | 1.609 |
| square inches | square centimeters | 6.451 |
| square feet | square meters | .093 |
| square yards | square meters | .836 |
| square miles | square kilometers | 2.590 |
| acres | square hectometers | .405 |
| cubic feet | cubic meters | .028 |
| cubic yards | cubic meters | .765 |
| fluid ounces | milliliters | 29,573 |
| pints | liters | .473 |
| quarts | liters | .946 |
| gallons | liters | 3.785 |
| ounces | grams | 28.349 |
| pounds | kilograms | .454 |
| short tons | metric tons | .907 |
| pound-feet | newton-meters | 1.365 |
| pound-inches | newton-meters | .11375 |

| *To change* | *To* | *Multiply by* |
|---|---|---|
| ounce-inches | newton-meters | .007062 |
| centimeters | inches | 3.94 |
| meters | feet | 3.280 |
| meters | yards | 1.094 |
| kilometers | miles | .621 |
| square centimeters | square inches | .155 |
| square meters | square feet | 10.764 |
| square meters | square yards | 1.196 |
| square kilometers | square miles | .386 |
| square hectometers | acres | 2.471 |
| cubic meters | cubic feet | 35.315 |
| cubic meters | cubic yards | 1.308 |
| milliliters | fluid ounces | .034 |
| liters | pints | 2.113 |
| liters | quarts | 1.057 |
| liters | gallons | .264 |
| grams | ounces | .035 |
| kilograms | pounds | 2.205 |
| metric tons | short tons | 1.102 |

# Temperature (Exact)

| | | | | |
|---|---|---|---|---|
| °F | Fahrenheit temperature | 5/9 (after subtracting 32) | Celsius temperature | °C |